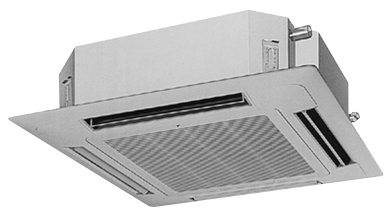


Service Manual

Split System Air Conditioners SkyAir Inverter

R-410A Heat Pump 60Hz
P Series



SkyAir Inverter P Series R-410A Heat Pump 60Hz

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1. SAFETY CONSIDERATIONS

Read these **SAFETY CONSIDERATIONS** carefully before performing any repair work. Comply with these safety symbols without fail.

Meanings of **DANGER**, **WARNING**, **CAUTION**, and **NOTE** Symbols:

-  **DANGER** Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
-  **WARNING** Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
-  **CAUTION** Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.
-  **NOTE** Indicates situations that may result in equipment or property-damage accidents only.

1.1 Safety Considerations for Repair

DANGER

- If refrigerant gas leaks during repair or service, ventilate the area immediately. Refrigerant gas may produce toxic gas if it comes into contact with flames. Refrigerant gas is heavier than air and replaces oxygen. In the event of an accident, a massive leak could lead to oxygen depletion, especially in basements, and an asphyxiation hazard could occur leading to serious injury or death.
- Do not start or stop the air conditioner operation by plugging or unplugging the power cable plug if a plug is used. Plugging or unplugging the power cable plug to operate the equipment may cause an electrical shock or fire.
- Use parts listed in the service parts list and appropriate tools to conduct repair work. The use of inappropriate parts or tools may cause an electrical shock or fire.
- Disconnect power before disassembling the equipment for repairs. Working on the equipment that is connected to the power supply may cause an electric shock. If it is necessary to supply power to the equipment to conduct repairs or to inspect the circuits, do not touch any electrically charged sections of the equipment.
- The step-up capacitor supplies high-voltage electricity to the electrical components of the outdoor unit. Discharge the capacitor completely before conducting repair work. A charged capacitor may cause an electrical shock.
- If refrigerant gas is discharged during repair work, do not touch the discharged refrigerant gas. The refrigerant gas may cause frostbite.
- Use only pipes, flare nuts, tools, and other materials designed specifically for R410A refrigerant systems. Never use tools or materials designed for R22 refrigerant systems on an R410A refrigerant system. Doing so can cause a serious accident or an equipment failure.
- Check to see if the parts and wires are mounted and connected properly, and if the connections at the soldered or crimped terminals are secure. Improper installation and connections may cause excessive heat generation, fire, or electrical shock.

WARNING

- Prior to disconnecting the suction or discharge pipe from the compressor at the welded section, pump-down the refrigerant gas completely in a well-ventilated place first. If there is refrigerant gas or oil remaining inside the compressor, the refrigerant gas or oil can discharge when the pipe is being disconnected and it may cause an injury.
- Wear a safety helmet, gloves, and a safety belt when working at an elevated height of more than 6.5 ft (2 m). Insufficient safety measures may cause a fall resulting in injury.
- Do not mix air or gas other than the specified refrigerant R410A to the refrigerant system. If air enters the refrigerant systems, it can cause an excessive high pressure resulting in equipment damage and injury.
- When relocating the equipment, check if the new installation site has sufficient strength to withstand the weight of the equipment. If the installation site does not have sufficient strength and the equipment is not properly secured, the equipment may fall and cause injury.
- Securely fasten the outside unit terminal cover (panel). If the terminal cover/panel is not fastened properly, dust or water may enter the outside unit causing fire or electric shock.
- When relocating the system, keep the refrigerant circuit free from substances other than the specified refrigerant (R-410A) such as air. Any presence of air or other foreign substance in the refrigerant circuit can cause an abnormal pressure rise or rupture, resulting in injury.
- If refrigerant gas leaks, locate the leaking point and repair it before charging refrigerant. After charging refrigerant, check for refrigerant leaks. If the leaking point cannot be located and the repair work must be stopped, perform a pump-down and close the service valve to prevent the refrigerant gas from leaking into the room. The refrigerant gas itself is harmless, but it may generate toxic gases if it comes into contact with flames.

**CAUTION**

- Do not repair the electrical components with wet hands. Working on the equipment with wet hands may cause an electrical shock.
- Do not clean the air conditioner by splashing water on it. Washing the unit with water may cause an electrical shock.
- Ground the unit when repairing equipment in a humid or wet place to avoid electrical shocks.
- Turn off the power when cleaning the equipment to prevent internal fans that rotate at high speed from starting suddenly as they can cause injury.
- Let the refrigerant lines cool down before performing any repair work. Working on the unit when the refrigerant lines are hot may cause burns.
- All welding and cutting operations must be done in a well-ventilated place to prevent the accumulation of toxic fumes or possibly oxygen deficiency to occur.
- Check the grounding and repair it if the equipment is not properly grounded. Improper grounding may cause an electrical shock.
- Measure the insulation resistance after the repair.
The resistance must be 1M Ω or higher. Faulty insulation may cause an electrical shock.

**NOTE**

- Check the drainage of the indoor unit after finishing repair work. Faulty drainage may cause water to enter the room resulting in wet floors and furniture.
- Do not tilt the unit when removing it. The water inside the unit may spill resulting in wet floors and furniture.
- Dismantling of the unit, disposal of the refrigerant, oil, and additional parts, should be done in accordance with the relevant local, state, and national regulations.

1.2 Safety Considerations for Users

**DANGER**

- Never attempt to modify the equipment. Doing so can cause electrical shock, excessive heat generation, or fire.
- If the power cable and lead wires have scratches or have become deteriorated, have them replaced. Damaged cable and wires may cause an electrical shock or fire.
- Do not use a joined power cable or an extension cord, or share the same power outlet with other

electrical appliances as it may cause an electrical shock or fire.

- Use an exclusive power circuit for the equipment. Insufficient circuit amperage capacity may cause an electrical shock or fire.

**WARNING**

- Do not damage or modify the power cable. Damaged or modified power cables may cause an electrical shock or fire. Placing heavy items on the power cable or pulling the power cable may damage the cable.
- Check the unit foundation for damage on a continual basis, especially if it has been in use for a long time. If left in a damaged condition, the unit may fall and cause injury. If the installation platform or frame has corroded, have it replaced. A corroded platform or frame may cause the unit to fall resulting in injury.
- If the unit has a power cable plug and it is dirty, clean the plug before securely inserting it into a power outlet. If the plug has a loose connection, tighten it or it may cause electrical shock or fire.

**CAUTION**

- After replacing the battery in the remote controller, dispose of the old battery to prevent children from swallowing it. If a child swallows the battery, see a doctor immediately.
- Never remove the fan guard of the unit. A fan rotating at high speed without the fan guard is very dangerous.
- Before cleaning the unit, stop the operation of the unit by turning the power off or by pulling the power cable plug out from its receptacle. Otherwise an electrical shock or injury may result.
- Do not wipe the controller operation panel with benzene, thinner, chemical dust cloth, etc. The panel may get discolored or the coating can peel off. If it is extremely dirty, soak a cloth in a water-diluted neutral detergent, squeeze it well, and wipe the panel clean. Then wipe it with another dry cloth.

Part 1

General Information

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1. Model Names and Power Supply

Indoor Unit		Outdoor Unit	Power Supply
Ceiling Mounted Cassette Type (Multi Flow)	FCQ18PVJU	RZQ18PVJU	VJ : 1φ, 208~230V, 60Hz
	FCQ24PVJU	RZQ24PVJU	
	FCQ30PVJU	RZQ30PVJU	
Ceiling Suspended Type	FHQ18PVJU	RZQ18PVJU	
	FHQ24PVJU	RZQ24PVJU	
	FHQ30PVJU	RZQ30PVJU	
Wall Mounted Type	FAQ18PVJU	RZQ18PVJU	
	FAQ24PVJU	RZQ24PVJU	

2. External Appearance

2.1 Indoor Units

Ceiling mounted cassette type (Multi flow)

FCQ18PVJU
FCQ24PVJU
FCQ30PVJU



Ceiling suspended type

FHQ18PVJU
FHQ24PVJU
FHQ30PVJU



Wall mounted type

FAQ18PVJU
FAQ24PVJU



2.2 Outdoor Units

RZQ18PVJU
RZQ24PVJU
RZQ30PVJU



Part 2

Specifications

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1. Specifications

1.1 FCQ

Ceiling Mounted Cassette Type (Multi flow)

Model	Indoor unit		FCQ18PVJU		FCQ24PVJU		FCQ30PVJU	
	Outdoor unit		RZQ18PVJU		RZQ24PVJU		RZQ30PVJU	
Power supply			1 phase 60Hz 208-230V		1 phase 60Hz 208-230V		1 phase 60Hz 208-230V	
Cooling capacity ¹		Btu/h	18,000		24,000		30,000	
Heating capacity ²		Btu/h	20,000		27,000		34,000	
Indoor unit			FCQ18PVJU		FCQ24PVJU		FCQ30PVJU	
Dimensions	HxWxD	in (mm)	11-3/8 × 33-1/8 × 33-1/8' (290 x 840 x 840)		11-3/8 × 33-1/8 × 33-1/8' (290 x 840 x 840)		11-3/8 × 33-1/8 × 33-1/8' (290 x 840 x 840)	
Coil	Type		Cross fin coil		Cross fin coil		Cross fin coil	
	RowsxStagesxFPI		2 × 12 × 17		2 × 12 × 17		2 × 12 × 17	
	Face area		ft ²		5.35		5.35	
Fan	Model		QTS45A17M		QTS45A17M		QTS45A17M	
	Type		Turbo fan		Turbo fan		Turbo fan	
	Motor output		W		90		90	
	Airflow rate (H/L)		cfm		(Cooling) 790/670 (Heating) 870/670		(Cooling) 790/670 (Heating) 870/670	
Air filter			—		—		—	
Mass (Weight)		lb (kg)	73 (33)		73 lbs (33)		73lbs (33)	
Piping connections	Liquid	in (mm)	φ3/8 (9.5) (Flare connection)		φ3/8 (9.5) (Flare connection)		φ3/8 (9.5) (Flare connection)	
	Gas	in (mm)	φ5/8 (15.8) (Flare connection)		φ5/8 (15.8) (Flare connection)		φ5/8 (15.8) (Flare connection)	
	Drain	in (mm)	VP25 (External dia. 1-1/4" (32), Internal dia. 1" (25.4))		VP25 (External dia. 1-1/4" (32), Internal dia. 1" (25.4))		VP25 (External dia. 1-1/4" (32), Internal dia. 1" (25.4))	
Remote controller (option)		Wired	BRC1D71		BRC1D71		BRC1D71	
		Wireless	BRC7C812		BRC7C812		BRC7C812	
Decoration panels (option)	Model		BYC125K-W19		BYC125K-W19		BYC125K-W19	
	Color		White (10Y9/0.5)		White (10Y9/0.5)		White (10Y9/0.5)	
	Dimension s	HxWxD	in (mm)		1-5/8 × 37-3/8 × 37-3/8 (41 x 950 x 950)		1-5/8 × 37-3/8 × 37-3/8 (41 x 950 x 950)	
	Air filter		Resin net (with mold resistant)		Resin net (with mold resistant)		Resin net (with mold resistant)	
	Weight		lb (kg)		11 lbs (5)		11 lbs (5)	
Outdoor unit			RZQ18PVJU		RZQ24PVJU		RZQ30PVJU	
Color			Ivory		Ivory		Ivory	
Dimensions	HxWxD	in (mm)	30-5/16 × 35-7/16 × 12-5/8" 770 x 900 x 320)		30-5/16 × 35-7/16 × 12-5/8" 770 x 900 x 320)		30-5/16 × 35-7/16 × 12-5/8" 770 x 900 x 320)	
Coil	Type		Cross fin coil		Cross fin coil		Cross fin coil	
	RowsxStagesxFPI		2 × 34 × 18		2 × 34 × 18		2 × 34 × 18	
	Face area		ft ²		7.1		7.1	
Comp.	Model		2YC63HXD#ED		2YC63HXD#ED		2YC63HXD#ED	
	Type		Hermetically sealed swing type		Hermetically sealed swing type		Hermetically sealed swing type	
	Motor output		kW		1.7		1.7	
Fan	Model		P47N11F		P47N11F		P47N11F	
	Type		Propeller fan		Propeller fan		Propeller fan	
	Motor output		W		70		70	
	Airflow rate		cfm		1,835		1,835	
Mass (Weight)		lb (kg)	150 lbs (68 kg)		150 lbs (68 kg)		150 lbs (68)	
Piping connections	Liquid	in (mm)	φ3/8" (9.5 mm) (Flare connection)		φ3/8" (9.5) (Flare connection)		φ3/8" (9.5) (Flare connection)	
	Gas	in (mm)	φ5/8" (15.8 mm) (Flare connection)		φ5/8" (15.8) (Flare connection)		φ5/8" (15.8) (Flare connection)	
	Drain	in (mm)	φ1" (25.4 mm) (Hole)		φ1" (25.4) (Hole)		φ1" (25.4) (Hole)	
Safety devices			High pressure switch. Outdoor fan driver overload protector. Thermal protector for indoor fan motor. Inverter overload protector. Fusible plugs. Fuse.		High pressure switch. Outdoor fan driver overload protector. Thermal protector for indoor fan motor. Inverter overload protector. Fusible plugs. Fuse.		High pressure switch. Outdoor fan driver overload protector. Thermal protector for indoor fan motor. Inverter overload protector. Fusible plugs. Fuse.	
Capacity step		%	100-0		100-0		100-0	
Refrigerant control			Electronic expansion valve		Electronic expansion valve		Electronic expansion valve	
Ref. piping	Standard length	ft (m)	25' (7.5)		25' (7.5)		25' (7.5)	
	Max. length	ft (m)	164' (50)		164' (50)		164' (50)	
	Max. height difference	ft (m)	98' (30)		98' (30)		98' (30)	
Refrigerant	Model		R410A		R410A		R410A	
	Charge (factory charge)	Lbs (kg)	5.1 (2.3)		5.1 (2.3)		5.1 (2.3)	
Ref. oil	Model		Refer to the name plate of compressor.		Refer to the name plate of compressor.		Refer to the name plate of compressor.	
	Charge	L	0.75		0.75		0.75	
Drawing Number			C : 4D063924D		C : 4D063924D		C : 4D063924D	

Notes:

1. The above data are based on the following conditions.

Cooling *1	Heating *2	Equivalent Piping Length	Hz, Volts
Indoor : 80°FDB, 67°FWB Outdoor : 95°FDB	Indoor : 70°FDB Outdoor : 47°FDB, 43°FWB	25 ft (7.5 m) (Level Difference : 0)	60Hz, 230V

2. Capacities are net, including a deduction for cooling (an addition for heating) for indoor fan motor heat.

1.2 FHQ

Ceiling Suspended Type

Model	Indoor unit		FHQ18PVJU	FHQ24PVJU	FHQ30PVJU
	Outdoor unit		RZQ18PVJU	RZQ24PVJU	RZQ30PVJU
Power supply			1 phase 60Hz 208-230V	1 phase 60Hz 208-230V	1 phase 60Hz 208-230V
Cooling capacity ¹		Btu/h	18,000	24,000	30,000
Heating capacity ²		Btu/h	20,000	27,000	34,000
Indoor unit			FHQ18PVJU	FHQ24PVJU	FHQ30PVJU
Color			White (10Y9/0.5)	White (10Y9/0.5)	White (10Y9/0.5)
Dimensions	H×W×D	in (mm)	7–11/16 × 62–5/8 × 26–3/4 (195 x 1590 x 680)	7–11/16 × 62–5/8 × 26–3/4 (195 x 1590 x 680)	7–11/16 × 62–5/8 × 26–3/4 (195 x 1590 x 680)
Coil	Type		Cross fin coil	Cross fin coil	Cross fin coil
	Rows×Stages×FPI		2 × 12 × 15 + 2 × 10 × 15	2 × 12 × 15 + 2 × 10 × 15	2 × 12 × 15 + 2 × 10 × 15
	Face area	ft²	3.66 + 2.95	3.66 + 2.95	3.66 + 2.95
Fan	Model		—	—	—
	Type		Sirocco fan	Sirocco fan	Sirocco fan
	Motor output	W	130	130	130
	Airflow rate (H/L)	cfm	790/670	790/670	790/670
Air filter			Resin net (With mold resistant)	Resin net (With mold resistant)	Resin net (With mold resistant)
Mass (Weight)		Lbs (kg)	90 (41)	90 (41)	90 (41)
Piping connections	Liquid	in (mm)	φ3/8 (9.5) (Flare Connection)	φ3/8 (9.5) (Flare connection)	φ3/8 (9.5) (Flare connection)
	Gas	in (mm)	φ5/8 (15.8) (Flare connection)	φ5/8 (15.8) (Flare connection)	φ5/8 (15.8) (Flare connection)
	Drain	in (mm)	VP20 (External dia. 1 (25.4), Internal dia. 3/4 (19.1))	VP20 (External dia. 1" (25.4 mm), Internal dia. 3/4" (19.1 mm))	VP20 (External dia. 1" (25.4), Internal dia. 3/4" (19.1))
Remote controller (option)	Wired		BRC1D71	BRC1D71	BRC1D71
	Wireless		BRC7E83	BRC7E83	BRC7E83
Outdoor unit			RZQ18PVJU	RZQ24PVJU	RZQ30PVJU
Color			Ivory	Ivory	Ivory
Dimensions	H×W×D	in (mm)	30–5/16 × 35–7/16 × 12–5/8 (770 x 900 x 320)	30–5/16 × 35–7/16 × 12–5/8 (770 x 900 x 320)	30–5/16 × 35–7/16 × 12–5/8 (770 x 900 x 320)
Coil	Type		Cross fin coil	Cross fin coil	Cross fin coil
	Rows×Stages×FPI		2 × 34 × 18	2 × 34 × 18	2 × 34 × 18
	Face area	ft²	7.1	7.1	7.1
Comp.	Model		2YC63HXD#ED	2YC63HXD#ED	2YC63HXD#ED
	Type		Hermetically sealed swing type	Hermetically sealed swing type	Hermetically sealed swing type
	Motor output	kW	1.7	1.7	1.7
Fan	Model		P47N11F	P47N11F	P47N11F
	Type		Propeller fan	Propeller fan	Propeller fan
	Motor output	W	70	70	70
	Airflow rate	cfm	1,835	1,835	1,835
Mass (Weight)		Lbs (kg)	150 (68)	150 (68)	150 (68)
Piping connections	Liquid	in (mm)	φ3/8 (9.5) (Flare connection)	φ3/8 (9.5) (Flare connection)	φ3/8 (9.5) (Flare connection)
	Gas	in (mm)	φ5/8 (15.8) (Flare connection)	φ5/8 (15.8) (Flare connection)	φ5/8 (15.8) (Flare connection)
	Drain	in (mm)	φ1 (25.4) (Hole)	φ1 (25.4) (Hole)	φ1 (25.4) (Hole)
Safety devices			High pressure switch. Outdoor fan driver overload protector. Thermal protector for indoor fan motor. Inverter overload protector. Fusible plugs. Fuse.	High pressure switch. Outdoor fan driver overload protector. Thermal protector for indoor fan motor. Inverter overload protector. Fusible plugs. Fuse.	High pressure switch. Outdoor fan driver overload protector. Thermal protector for indoor fan motor. Inverter overload protector. Fusible plugs. Fuse.
Capacity step		%	100-0	100-0	100-0
Refrigerant control			Electronic expansion valve	Electronic expansion valve	Electronic expansion valve
Ref. piping	Standard length	ft (m)	25 (7.5)	25 (7.5)	25 (7.5)
	Max. length	ft (m)	164' (50)	164' (50)	164' (50)
	Max. height difference	ft (m)	98' (30)	98' (30)	98' (30)
Refrigerant	Model		R410A	R410A	R410A
	Charge (factory charge)	Lbs (kg)	5.1 (2.3)	5.1 (2.3)	5.1 (2.3)
Ref. oil	Model		Refer to the name plate of compressor.	Refer to the name plate of compressor.	Refer to the name plate of compressor.
	Charge	L	0.75	0.75	0.75
Drawing Number			C : 4D063925C	C : 4D063925C	C : 4D063925C

Notes:

1. The above data are based on the following conditions.

Cooling *1	Heating *2	Equivalent Piping Length	Hz, Volts
Indoor : 80°FDB, 67°FWB Outdoor : 95°FDB	Indoor : 70°FDB Outdoor : 47°FDB, 43°FWB	25 ft (7.5 m) (Level Difference : 0)	60Hz, 230V

2. Capacities are net, including a deduction for cooling (an addition for heating) for indoor fan motor heat.

1.3 FAQ

Wall Mounted Type

Model	Indoor unit		FAQ18PVJU		FAQ24PVJU	
	Outdoor unit		RZQ18PVJU		RZQ24PVJU	
Power supply			1 phase 60Hz 208-230V		1 phase 60Hz 208-230V	
Cooling capacity ¹		Btu/h	18,000		24,000	
Heating capacity ²		Btu/h	20,000		26,000	
Indoor unit			FAQ18PVJU		FAQ24PVJU	
Color			White (3.0Y8.5/0.5)		White (3.0Y8.5/0.5)	
Dimensions	HxWxD	in (mm)	11-3/8 x 41-3/8 x 9 (290 x 1050 x 230)		11-3/8 x 41-3/8 x 9 (290 x 1050 x 230)	
Coil	Type		Cross fin coil		Cross fin coil	
	RowsxStagesxFPI		2 x 14 x 18		2 x 14 x 18	
	Face area	ft²	2.29		2.29	
Fan	Model		QCL9686M		QCL9686M	
	Type		Crossflow fan		Crossflow fan	
	Motor output	W	43		43	
	Airflow rate (H/L)	cfm	500/400		635/470	
Air filter			Resin net (Washable)		Resin net (Washable)	
Mass (Weight)		lb (kg)	31 (14)		31(14)	
Piping connections	Liquid	in (mm)	φ3/8 (9.5) (Flare connection)		φ3/8" (9.5) (Flare connection)	
	Gas	in (mm)	φ5/8 (15.8) (Flare connection)		φ5/8" (15.8) (Flare connection)	
	Drain	in (mm)	VP13 External dia. 11/16 (17.5) Internal dia. 1/2 (12.7)		VP13 External dia. 11/16"(17.5) Internal dia. 1/2 (12.7)	
Remote controller (option)	Wired		BRC1D71		BRC1D71	
	Wireless		BRC7E818		BRC7E818	
Outdoor unit			RZQ18PVJU		RZQ24PVJU	
Color			Ivory		Ivory	
Dimensions	HxWxD	in (mm)	30-5/16 x 35-7/16 x 12-5/8 (770 x 900 x 320)		30-5/16 x 35-7/16 x 12-5/8 (770 x 900 x 320)	
Coil	Type		Cross fin coil		Cross fin coil	
	RowsxStagesxFPI		2 x 34 x 18		2 x 34 x 18	
	Face area	ft²	7.1		7.1	
Comp.	Model		2YC63HDXD#ED		2YC63HDXD#ED	
	Type		Hermetically sealed swing type		Hermetically sealed swing type	
	Motor output	kW	1.7		1.7	
Fan	Model		P47N11F		P47N11F	
	Type		Propeller fan		Propeller fan	
	Motor output	W	70		70	
	Airflow rate	cfm	1,835		1,835	
Mass (Weight)		lb (kg)	150 lbs (67)		150 lbs (67)	
Piping connections	Liquid	in (mm)	φ3/8 (9.5) (Flare connection)		φ3/8 (9.5) (Flare connection)	
	Gas	in (mm)	φ5/8 (15.8) (Flare connection)		φ5/8 (15.8) (Flare connection)	
	Drain	in (mm)	φ1 (25.4) (Hole)		φ1 (25.4) (Hole)	
Safety devices			High pressure switch. Outdoor fan driver overload protector. Thermal protector for indoor fan motor. Inverter overload protector. Fusible plugs. Fuse.		High pressure switch. Outdoor fan driver overload protector. Thermal protector for indoor fan motor. Inverter overload protector. Fusible plugs. Fuse.	
Capacity step		%	100-0		100-0	
Refrigerant control			Electronic expansion valve		Electronic expansion valve	
Ref. piping	Standard length	ft (m)	25' (7.5)		25' (7.5)	
	Max. length	ft (m)	164' (50)		164' (50)	
	Max. height difference	ft (m)	98' (30)		98' (30)	
Refrigerant	Model		R410A		R410A	
	Charge (factory charge)	Lbs (kg)	5.1 (2.3)		5.1 (2.3)	
Ref. oil	Model		Refer to the name plate of compressor.		Refer to the name plate of compressor.	
	Charge	L	0.75		0.75	
Drawing Number			C : 4D062151D		C : 4D062151D	

Notes:

1. The above data are based on the following conditions.

Cooling *1	Heating *2	Equivalent Piping Length	Hz, Volts
Indoor : 80°FDB, 67°FWB Outdoor : 95°FDB	Indoor : 70°FDB Outdoor : 47°FDB, 43°FWB	25 ft (7.5 m) (Level Difference : 0)	60Hz, 230V

2. Capacities are net, including a deduction for cooling (an addition for heating) for indoor fan motor heat.

Part 3

List of Electrical and Functional Parts

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1. List of Electrical and Functional Parts

1.1 Outdoor Units

Item	Name		Symbol	Model			Remark (P.C.B. terminal)
				RZQ18 PVJU	RZQ24 PVJU	RZQ30 PVJU	
Compressor	Inverter	Type Output	M1C	2YC63HXD#ED 1.7kW			—
Fan motor	Motor		M1F	0.07kW			—
	Overcurrent relay		—	3.2A			—
Functional parts	Electronic expansion valve	Cooling Heating	Y1E	1400pls			A1P X21A
	Four-way valve		Y1S	STF-01AQ555A1			A1P X25A
	Solenoid valve (Hot gas)		Y2S	TEV-MOAQ1684Y1			A1P X26A
	Solenoid valve (Injection)		Y3S	TEV-MOAQ1685Y1			A1P X27A
	PI control						
Pressure-related parts	Pressure switch (INV.)		S1PH	ACB-4UB10 ON: 580+0/-22 psi OFF: 435±22 psi			A1P X32A
	Fusible plug		—	DFP-3L 158~167°F			—
	Pressure sensor (HP)		S1NPH	NSK-BD042D~212 0~602 psi			A1P X504A
	Pressure sensor (LP)		S1NPL	NSK-BD017D-211 -7~247 psi			A1P X503A
Thermistor	Main P.C.B.	For outdoor air	R1T	ST9303-4			A1P X11A
		For discharge	R2T	ST9701-4			A1P X12A 1-2Pin
		For suction 1	R3T	ST8602A-5			A1P X12A 3-4Pin
		For heat exchanger	R4T	ST8604A-7			A1P X12A 5-6Pin
		For suction 2	R5T	ST8604A-7			A1P X12A 7-8Pin

1.2 Indoor Units

Parts Name		Symbol	Model			Remark
			FCQ 18PVJU	FCQ 24PVJU	FCQ 30PVJU	
Remote Controller	Wired Remote Controller		BRC1D71			Option
	Wireless Remote Controller		BRC7C812			
Motors	Fan Motor	M1F	1φ90W 6P			
			Thermal Protector 266°F : OFF 176°F : ON			
	Capacitor, fan motor	C1	5.0μF 450VAC			
	Drain Pump	M1P	PLD-12230DM Thermal Fuse 293°F			
	Swing Motor	M1S	MP35HCA [3P007482-1]			
Thermistors	Thermistor (Suction Air)	R1T	ST8601A-1 φ4 L250 20kΩ (77°F)			
	Thermistor (for Heat Exchanger High Temp.)	R3T	ST8605-3 φ8 L630 20kΩ (77°F)			
	Thermistor (Heat Exchanger)	R2T	ST8602A-3 φ6 L630 20kΩ (77°F)			
Others	Float Switch	S1L	FS-0211			
	Fuse	F1U	250V 5A φ5.2			
	Transformer	T1R	TR25H25R0			

Parts Name		Symbol	Model			Remarks
			FHQ 18PVJU	FHQ 24PVJU	FHQ 30PVJU	
Remote Controller	Wired Remote Controller		BRC1D71			Optional
	Wireless Controller		BRC7E83			
Motors	Fan Motor	M1F	1ϕ130W			
			Thermal protector 266°F : OFF 176°F : ON			
	Capacitor for Fan Motor	C1R	9.0μF-450V			
	Swing Motor	M1S	MT8-L[3P058751-1] AC200~240V			
Thermistors	Thermistor (Suction Air)	R1T	ST8601A-1 ϕ4 L250 20kΩ (77°F)			
	Thermistor (for Heat Exchanger High Temp.)	R3T	ST8605-6 ϕ8 L = 1250 20kΩ (77°F)			
	Thermistor (Heat Exchanger)	R2T	ST8602A-6 ϕ6 L = 1250 20kΩ (77°F)			
Others	Fuse	F1U	250V 5A			
	Transformer	T1R	TR25H25R0			

Parts Name		Symbol	Model		Remark
			FAQ 18PVJU	FAQ 24PVJU	
Remote Controller	Wired Remote Controller		BRC1D71		Option
	Wireless Controller		BRC7E818		
Motors	Fan Motor	M1F	1φ43W		
			Thermal protector 266°F : OFF 176°F : ON		
	Swing Motor	M1S	MSFBC20C21 [3SB40550-1] AC200~240V		
Thermistors	Thermistor (Suction Air)	R1T	ST8601-2 φ4 L400 20kΩ (77°F)		
	Thermistor (for Heat Exchanger High Temp.)	R3T	ST8605-2 φ8 L400 20kΩ (77°F)		
	Thermistor (Heat Exchanger)	R2T	ST8602-2 φ6 L400 20kΩ (77°F)		
Others	Float Switch	S1L	250V 3.15A		
	Fuse	F1U	OPTION		

Part 4

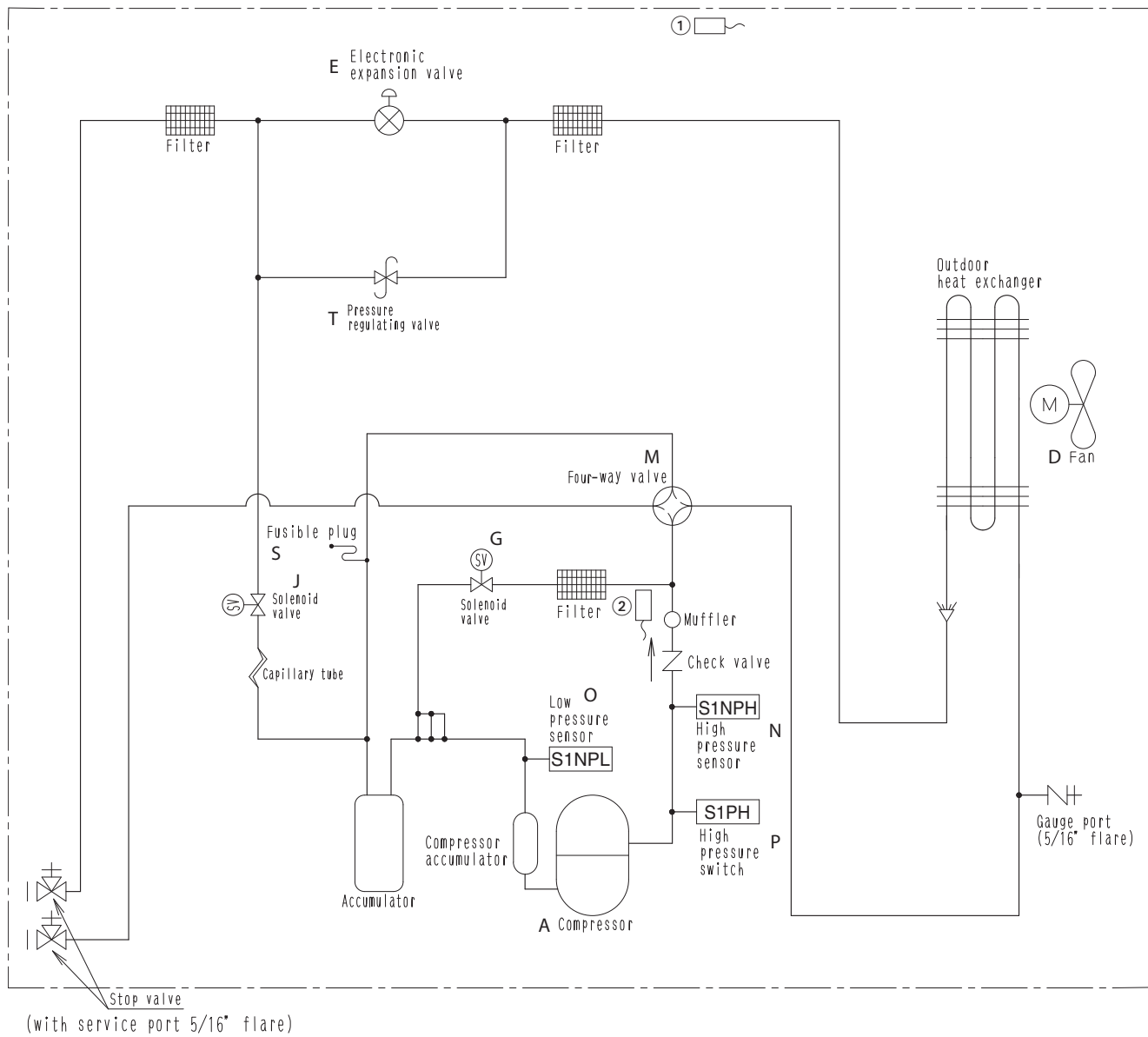
Refrigerant Circuit

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1. Refrigerant Circuit

1.1 RZQ18·24·30PVJU

No. in refrigerant system diagram	Symbol	Name	Major Function
A	M1C	Inverter compressor (INV.)	Inverter compressor is operated on frequencies between 52 Hz and 177 Hz by using the inverter. 17 steps
D	M1F	Inverter fan	Since the system is of air heat exchanging type, the fan is operated at 8-step rotation speed by using the inverter.
E	Y1E	Electronic expansion valve (Main: EV1)	While in heating operation, PI control is applied to keep the outlet superheated degree of air heat exchanger constant.
G	Y1S	Solenoid valve (Hot gas: SVP)	Prevents the low pressure from transient falling.
J	Y2S	Solenoid valve (Receiver gas discharging: SVG)	Collects refrigerant to receiver.
M	Y3S	Four-way valve	Switches the operation mode between cooling and heating.
N	S1NPH	High pressure sensor	Detects high pressure.
O	S1NPL	Low pressure sensor	Detects low pressure.
P	S1PH	HP pressure switch (For INV. compressor)	Prevents the increase of high pressure when a malfunction occurs, this switch is activated at high pressure of 580 psi or more to stop the compressor operation.
S	—	Fusible plug	Prevents the increase of pressure when abnormal heating is caused by fire or other heat factors, the fusible part of the plug is molten at a temperature of 158 to 167°F to release the pressure into the atmosphere.
T	—	Pressure regulating valve 1 (Receiver to discharge pipe)	This valve opens at a pressure of 290 to 390 psi for prevention of pressure increase, thus resulting in no damage of functional parts due to the increase of pressure in transportation or storage.
1	R1T	Thermistor (Outdoor air: Ta)	Detects outdoor temperature, correct discharge pipe temperature, and other functions.
2	R2T	Thermistor (INV. discharge pipe: Tdi)	Detects discharge pipe temperature, make the temperature protection control of compressor, and others.
3	R3T	Thermistor (Suction pipe: Ts1)	Detects suction pipe temperature, keep the suction superheated degree constant in heating operation, and other functions.
4	R4T	Thermistor (Heat exchanger deicer: Tb)	Detects liquid pipe temperature of air heat exchanger, determine defrosting operation, and other functions.
5	R5T	Thermistor (Suction pipe: Ts2)	Calculates the internal temperature of the compressor.

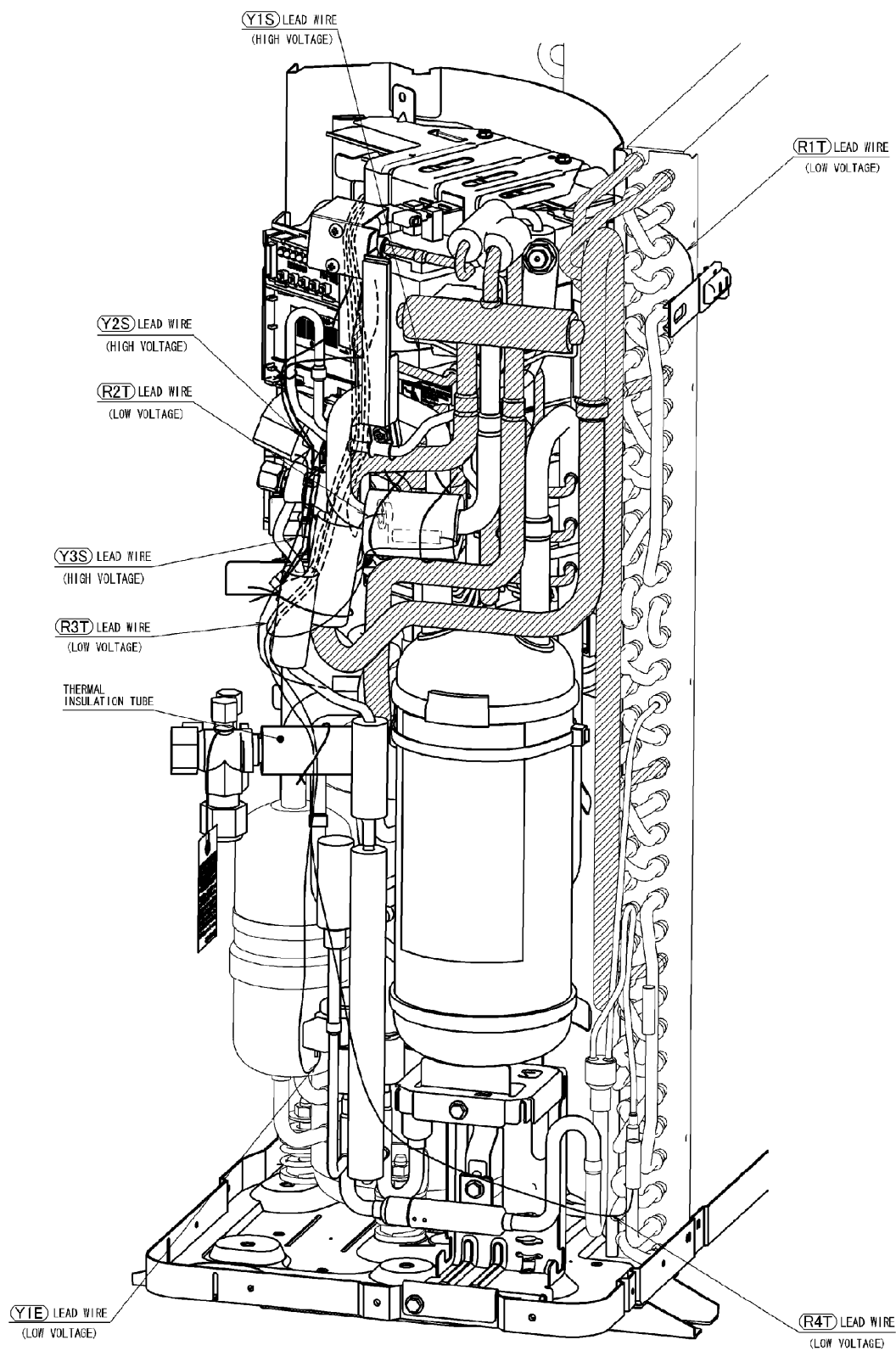


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2. Functional Parts Layout

2.1 RZQ18-30PVJU

Overview



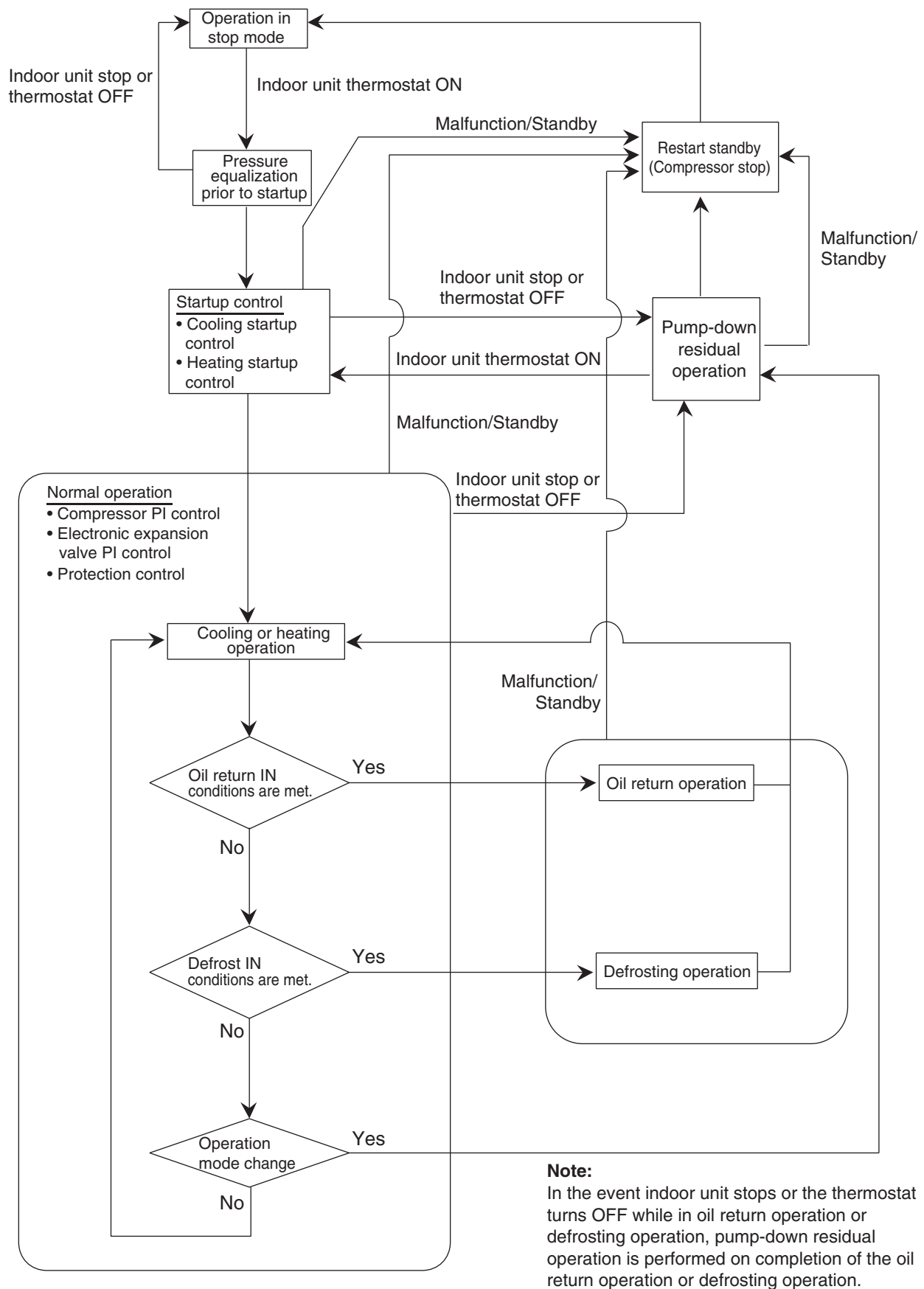
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Part 5

Function

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1. Operation Mode



2. Basic Control

2.1 Normal Operation

■ Cooling Operation

Actuator	Operation	Remarks
Compressor	Compressor PI control	Used for high pressure protection control, low pressure protection control, discharge pipe temperature protection control, and compressor operating frequency upper limit control with inverter protection control.
Outdoor unit fan	Cooling fan control	—
Four-way valve	OFF	—
Main electronic expansion valve (EV1)	1400 pls	—
Subcooling electronic expansion valve (EV2)	PI control	—
Hot gas bypass valve (SVP)	OFF	This valve turns on with low pressure protection control.
Receiver gas discharging valve (SVG)	OFF	—

■ Heating Operation

Actuator	Operation	Remarks
Compressor	Compressor PI control	Used for high pressure protection control, low pressure protection control, discharge pipe temperature protection control, and compressor operating frequency upper limit control with inverter protection control.
Outdoor unit fan	STEP8	The fan step changes to STEP1 with high pressure > 454 psi.
Four-way valve	ON	—
Main electronic expansion valve (EV1)	PI control	—
Subcooling electronic expansion valve (EV2)	0 pls	—
Hot gas bypass valve (SVP)	OFF	This valve turns on with low pressure protection control.
Receiver gas discharging valve (SVG)	OFF	—

* Heating operation is not functional at an outdoor air temperature of 86°FDB or more.

2.2 Compressor PI Control

Compressor PI Control

Carries out the compressor capacity PI control to maintain Te at constant during cooling operation and Tc at constant during heating operation to ensure stable unit performance.

[Cooling operation]

Controls compressor capacity to adjust Te to achieve target value (TeS).

Te : Low pressure equivalent saturation temperature (°F)

Te setting (Set in Set-up mode 2)

L	M (Normal) (factory setting)	H
37.5	43	48

TeS : Target Te value
(Varies depending on Te setting, operating frequency, etc.)

[Heating operation]

Controls compressor capacity to adjust Tc to achieve target value (TcS).

Tc : High pressure equivalent saturation temperature (°F)

Tc setting

L	M (Normal) (factory setting)	H
109.5	115	120

TcS : Target Tc value
(Varies depending on Tc setting, operating frequency, etc.)

RZQ18 · 24 · 30P

STEP	INV.
1	52Hz
2	57Hz
3	62Hz
4	68Hz
5	74Hz
6	81Hz
7	88Hz
8	96Hz
9	104Hz
10	110Hz
11	116Hz
12	124Hz
13	133Hz
14	143Hz
15	158Hz
16	165Hz
17	177Hz

* Compressors may operate in a pattern other than those listed in above tables subject to the operating conditions.

2.3 Electronic Expansion Valve PI Control

Main Electronic Expansion Valve EV1 Control

Carries out the electronic expansion valve (Y1E) PI control to maintain the evaporator outlet superheated degree (SH) at constant during heating operation to make maximum use of the outdoor unit heat exchanger (evaporator).

$$SH = T_s - T_e$$

SH : Evaporator outlet superheated degree (°F)

T_s : Suction pipe temperature detected by thermistor R2T (°F)

T_e : Low pressure equivalent saturation temperature (°F)

The optimum initial value of the evaporator outlet superheated degree is 5°C (9°F), but varies depending on the discharge pipe superheated degree of inverter compressor.

Subcooling Electronic Expansion Valve EV2 Control

Makes PI control of the electronic expansion valve (Y2E) to keep the superheated degree (SH) of the outlet gas pipe on the evaporator side for the full use of the subcooling heat exchanger.

$$SH = T_{sh} - T_e$$

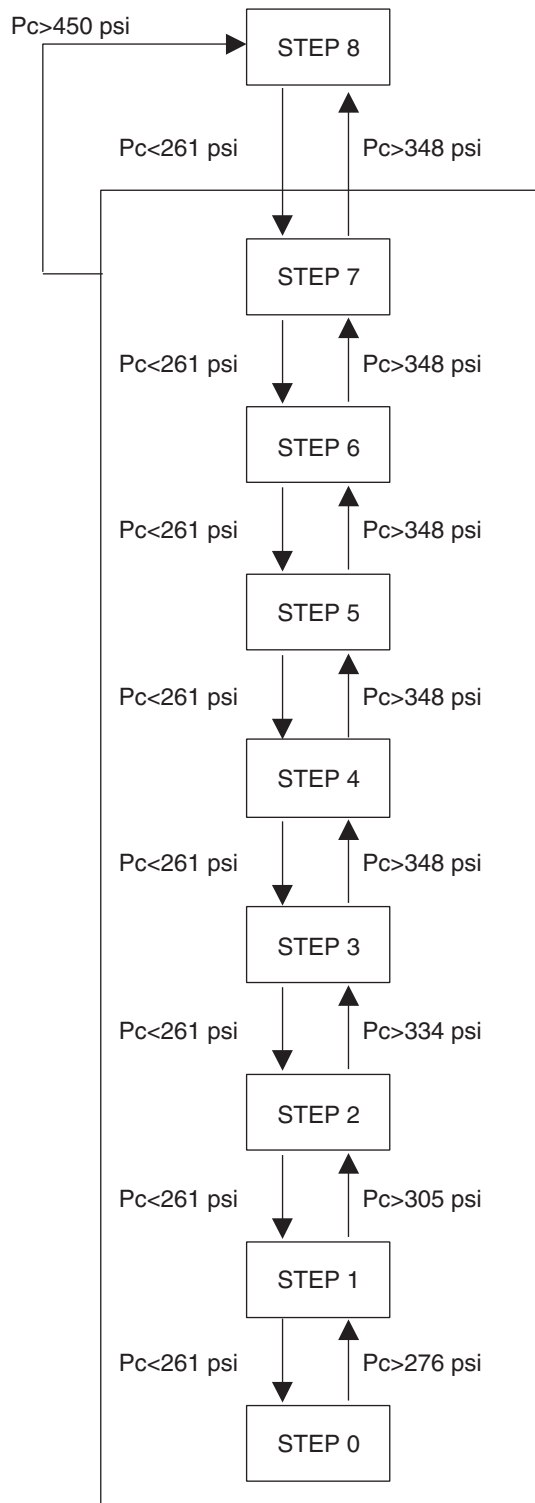
SH : Outlet superheated degree of evaporator (°F)

T_{sh} : Suction pipe temperature detected with the thermistor R5T (°F)

T_e : Low pressure equivalent saturation temperature (°F)

2.4 Cooling Operation Fan Control

In cooling operation with low outdoor air temperature, this control is used to provide the adequate amount of circulation air with liquid pressure secured by high pressure control using outdoor unit fan.



Pc: HP pressure sensor detection value

Fan Steps

Cooling	M1F	M2F
STEP 0	0 rpm	0 rpm
STEP 1	250 rpm	0 rpm
STEP 2	400 rpm	0 rpm
STEP 3	285 rpm	250 rpm
STEP 4	360 rpm	325 rpm
STEP 5	445 rpm	410 rpm
STEP 6	580 rpm	545 rpm
STEP 7	715 rpm	680 rpm
STEP 8	850 rpm	815 rpm

Reference

Heating	M1F	M2F
STEP 1	250 rpm	0 rpm
STEP 8	850 rpm	815 rpm

There are 2 steps in heating operation.

3. Special Control

3.1 Startup Control

On activation, the following control is performed to lighten the load of the compressor with liquid refrigerant located at the compressor at startup. Also, the position of the four-way valve is defined.

3.1.1 Startup Control in Cooling Operation

Actuator	Operation	Remarks
Compressor	Differential pressure control	Compressor operating frequency increases by 2 step / 20 sec. until $P_c - P_e > 58$ psi.
Outdoor unit fan	High pressure control	Initial fan speed is set to STEP 0. 1-step increase with $P_c > 305$ psi 1-step decrease with $P_c < 261$ psi
Four-way valve	OFF	—
Main electronic expansion valve (EV1)	1400 pls	—
Subcooling electronic expansion valve (EV2)	0 pls	—
Hot gas bypass valve (SVP)	ON	—
Receiver gas discharging valve (SVG)	OFF	—
Ending conditions	or $\left[\begin{array}{l} \bullet 230 \text{ sec.} \\ \bullet P_c - P_e > 58 \text{ psi} \\ \bullet 45 \text{ sec.} \end{array} \right. \& \left(\begin{array}{l} \bullet 230 \text{ sec.} \\ \bullet P_c - P_e > 58 \text{ psi} \\ \bullet 45 \text{ sec.} \end{array} \right.$	

3.1.2 Startup Control in Heating Operation

Actuator	Operation	Remarks
Compressor	Differential pressure control	Compressor operating frequency increases by 2 step / 20 sec. until $P_c - P_e > 58$ psi
Outdoor unit fan	STEP 8	—
Four-way valve	ON	—
Main electronic expansion valve (EV1)	180 pls	—
Subcooling electronic expansion valve (EV2)	0 pls	—
Hot gas bypass valve (SVP)	ON	—
Receiver gas discharging valve (SVG)	OFF	—
Ending conditions	or $\left[\begin{array}{l} \bullet 145 \text{ sec.} \\ \bullet P_c - P_e > 58 \text{ psi} \\ \bullet 15 \text{ sec.} \end{array} \right. \& \left(\begin{array}{l} \bullet 145 \text{ sec.} \\ \bullet P_c - P_e > 58 \text{ psi} \\ \bullet 15 \text{ sec.} \end{array} \right.$	

3.2 Oil Return Operation

Oil discharged by the compressor to the field piping is collected by the oil return operation.

3.2.1 Oil Return Operation in Cooling Operation

[Conditions to start]

The cooling oil-returning operation is started under the following conditions:

- Integrated amount of displaced oil
- Timer

After the power is turned on, integrated operating time is 2 hours and subsequently every 8 hours.)

In addition, the integrated amount of displaced oil is derived from T_c , T_e , and the compressor load.

Outdoor unit actuator	Oil return preparation operation	Oil return operation	Postoil-return operation
Compressor	Upper limit control	124 Hz	124 Hz
Outdoor unit fan	Fan control	Fan control	Fan control
Four-way valve	OFF	OFF	OFF
Main electronic expansion valve (EV1)	1400 pls	1400 pls	1400 pls
Subcooling electronic expansion valve (EV2)	SH control	0 pls	0 pls
Hot gas bypass valve (SVP)	OFF	ON	ON
Receiver gas discharging valve (SVG)	OFF	OFF	OFF
Ending conditions	20 sec.	or $\left[\begin{array}{l} \bullet 6 \text{ min.} \\ \bullet T_s - T_e < 5 \end{array} \right.$	3 min.

Indoor unit actuator		Cooling oil return operation
Fan	Thermostat ON unit	Set Air Volume
	Stopping unit	OFF
	Thermostat OFF unit	OFF
Electronic expansion valve	Thermostat ON unit	Normal opening
	Stopping unit	200 pls
	Thermostat OFF unit	200 pls

3.2.2 Oil Return Operation in Heating Operation

[Conditions to start]

The heating oil-returning operation is started under the following conditions:

■ Integrated amount of displaced oil

■ Timer

(After the power is turned on, integrated operating-time is 2 hours and subsequently every 8 hours.)

In addition, the integrated amount of displaced oil is derived from T_c , T_e , and the compressor load.

Outdoor Unit Actuator	Oil return preparation operation	Oil return operation	Post-oil-return operation
Compressor	Upper limit control	124 Hz	2-step increase from 52 Hz to ($P_c - P_e > 58$ psi) time
Outdoor unit fan	STEP 8	OFF	STEP 8
Four-way valve	ON	OFF	ON
Main electronic expansion valve (EV1)	SH control	1400 pls	200~400 pls
Subcooling electronic expansion valve (EV2)	0 pls	0 pls	0 pls
Hot gas bypass valve (SVP)	OFF	ON	ON
Receiver gas discharging valve (SVG)	ON	ON	OFF
Ending conditions	130 sec.	or $\left[\begin{array}{l} \bullet 6 \text{ min.} \\ \bullet T_s - T_e < 5 \end{array} \right.$	or $\left[\begin{array}{l} \bullet 160 \text{ sec.} \\ \bullet P_c - P_e > 58 \text{ psi} \end{array} \right.$

* From the preparation of the oil-returning operation to the oil-returning operation, and from the oil-returning operation to the operation after oil-returning, the compressor stops for 1 minute to reduce noise when changing the position of the four-way valve.

Indoor unit actuator		Heating oil return operation
Fan	Thermostat ON unit	OFF
	Stopping unit	OFF
	Thermostat OFF unit	OFF
Electronic expansion valve	Thermostat ON unit	500 pls
	Stopping unit	500 pls
	Thermostat OFF unit	500 pls

3.3 Defrosting Operation

The defrost operation is performed to solve frost on the outdoor unit heat exchanger when heating, and the heating capacity is recovered.

[Conditions to start]

The defrost operation is started under the following conditions:

- Outdoor heat exchanger heat transfer co-efficiency
- Temperature of heat-exchange (Tb)
- Timer (2 hours at the minimum)

In addition, outdoor heat-exchange co-efficiency is derived from Tc, Te, and the compressor load.

Outdoor unit actuator	Defrost preparation operation	Defrost operation	Post Defrost operation
Compressor	52 Hz	177 Hz	2-step increase from 52 Hz to (Pc - Pe>58 psi) every 20 sec.
Outdoor unit fan	STEP 8	OFF	STEP 8
Four-way valve	ON	OFF	ON
Main electronic expansion valve (EV1)	SH control	1400 pls	200~400 pls
Subcooling electronic expansion valve (EV2)	0 pls	0 pls	0 pls
Hot gas bypass valve (SVP)	OFF	ON	ON
Receiver gas discharging valve (SVG)	ON	ON	OFF
Ending conditions	130 sec.	or [• 15 min. • Tb >51.8°F	or [• 160 sec. • Pc - Pe>58 psi

* From the preparing operation to the defrost operation, and from the defrost operation to the operation after defrost, the compressor stops for 1 minute to reduce noise on changing of the four-way valve.

Indoor unit actuator		During defrost
Fan	Thermostat ON unit	OFF
	Stopping unit	OFF
	Thermostat OFF unit	OFF
Electronic expansion valve	Thermostat ON unit	500 pls
	Stopping unit	500 pls
	Thermostat OFF unit	500 pls

3.4 Pump-down Residual Operation

When activating the compressor, if the liquid refrigerant remains in the heat-exchanger, the liquid enters into the compressor and dilutes oil therein resulting in a decrease of lubricity.

Therefore, the pump-down residual operation is performed to collect the refrigerant in the heat-exchanger when the compressor is down.

3.4.1 Pump-down Residual Operation in Cooling Operation

Actuator	Master unit operation
Compressor	124 Hz
Outdoor unit fan	Fan control
Four-way valve	OFF
Main electronic expansion valve (EV1)	2000 pls
Subcooling electronic expansion valve (EV2)	0 pls
Hot gas bypass valve (SVP)	OFF
Receiver gas discharging valve (SVG)	ON → OFF
Ending conditions	or • 30 sec. • Pe<73 psi • Td>230°F

3.4.2 Pump-down Residual Operation in Heating Operation

Actuator	Master unit operation
Compressor	124 Hz
Outdoor unit fan	STEP 8
Four-way valve	ON
Main electronic expansion valve (EV1)	0 pls
Subcooling electronic expansion valve (EV2)	0 pls
Hot gas bypass valve (SVP)	OFF
Receiver gas discharging valve (SVG)	ON → OFF
Ending conditions	or • 3 min. • Pe<36 psi • Td>230°F

3.5 Restart Standby

Restart is not possible to prevent frequent power-on/off and to equalize pressure in the refrigerant system.

Actuator	Operation	Remarks
Compressor	OFF	—
Outdoor unit fan	Ta>86°F: STEP 4 Ta≤86°F: OFF	—
Four-way valve	Keep former condition.	—
Main electronic expansion valve (EV1)	0 pls	—
Subcooling electronic expansion valve (EV2)	0 pls	—
Hot gas bypass valve (SVP)	ON	—
Receiver gas discharging valve (SVG)	OFF	—
Ending conditions	5 min.	—

3.6 Stopping Operation

When the system is down the actuator stops/clears all operations.

3.6.1 When System is in Stop Mode

Actuator	Operation
Compressor	OFF
Outdoor unit fan	OFF
Four-way valve	Keep former condition.
Main electronic expansion valve (EV1)	0 pls
Subcooling electronic expansion valve (EV2)	0 pls
Hot gas bypass valve (SVP)	OFF
Receiver gas discharging valve (SVG)	OFF
Ending conditions	Indoor unit thermostat is turned ON.

3.7 Pressure Equalization Prior to Startup

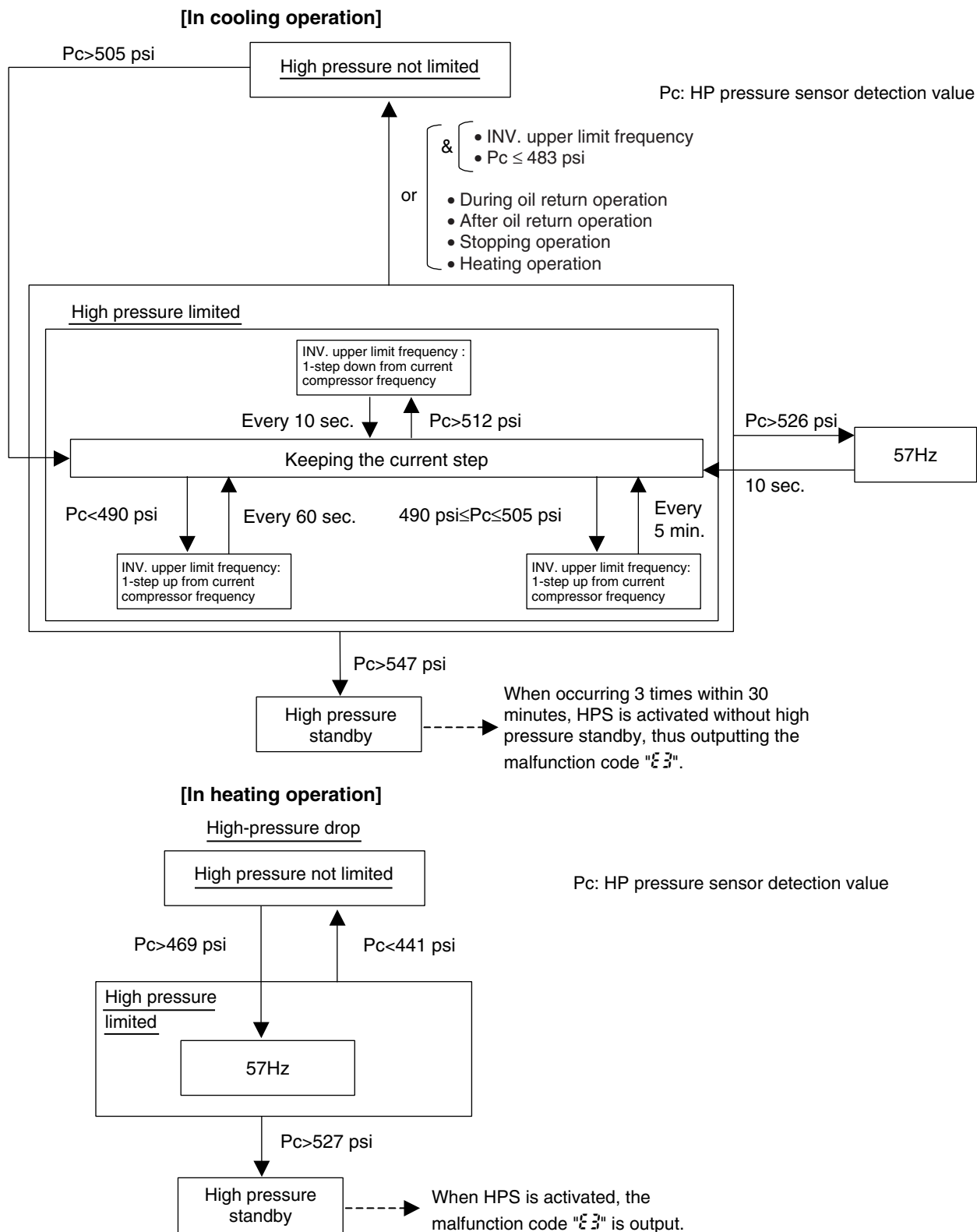
Before activating the compressor, the activation load is lightened by equalization across the compressor. In addition, inverters turn on electricity and capacitors are charged.

Actuator	Operation	Remarks
Compressor	OFF	—
Outdoor unit fan	Cooling:OFF Heating:Ta>78.8°F; STEP 8, Ta≤78.8°F; OFF	—
Four-way valve	Keep former condition.	—
Main electronic expansion valve (EV1)	0 pls	—
Subcooling electronic expansion valve (EV2)	0 pls	—
Hot gas bypass valve (SVP)	ON	—
Receiver gas discharging valve (SVG)	OFF	—
Ending conditions	or $\left[\begin{array}{l} \bullet 3 \text{ min.} \\ \bullet P_c - P_e < 29 \text{ psi} \end{array} \right.$	—

4. Protection Control

4.1 High Pressure Protection Control

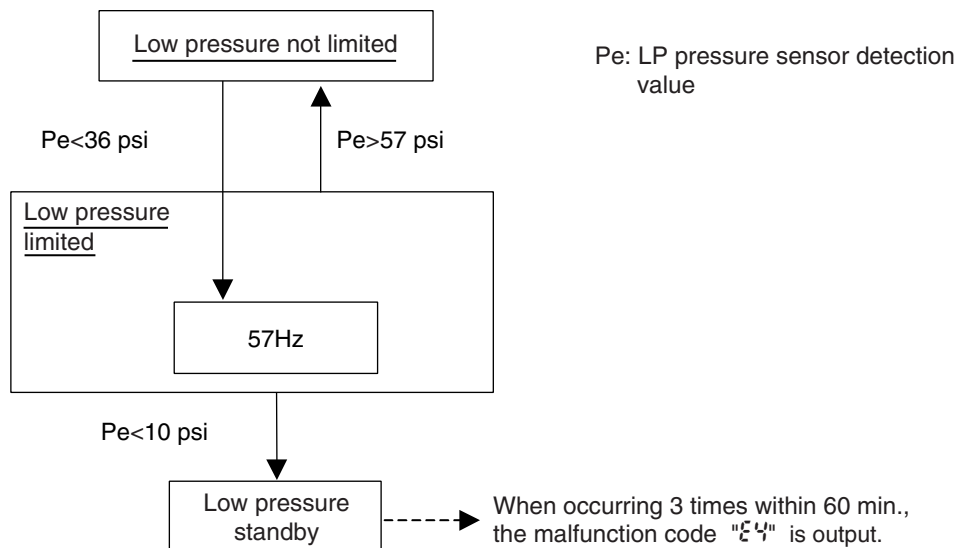
This high pressure protection control is used to prevent the activation of protection devices due to abnormal increase of high pressure and to protect compressors against the transient increase of high pressure.



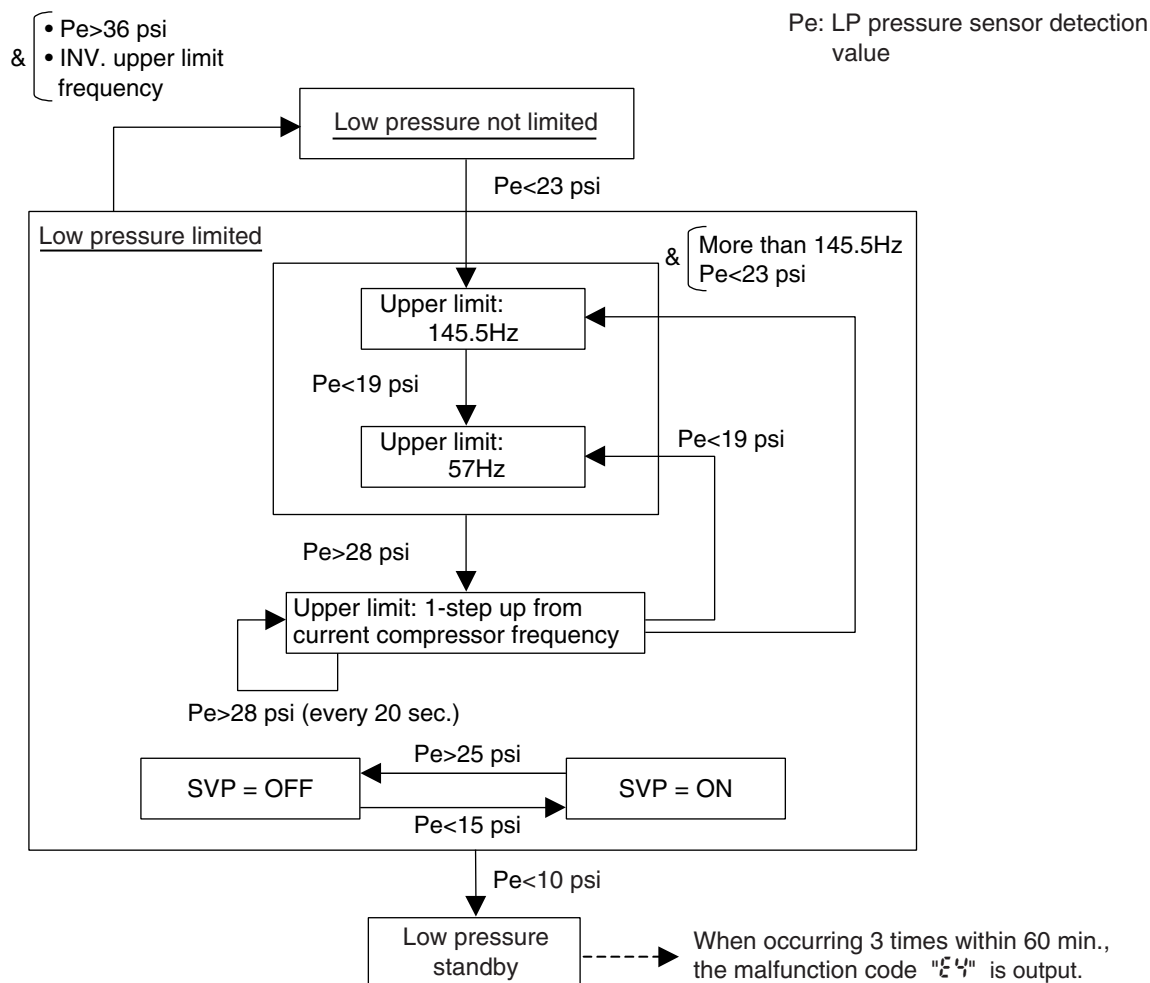
4.2 Low Pressure Protection Control

This low pressure protection control is used to protect compressors against the transient decrease of low pressure.

[In cooling operation]



[In heating operation]



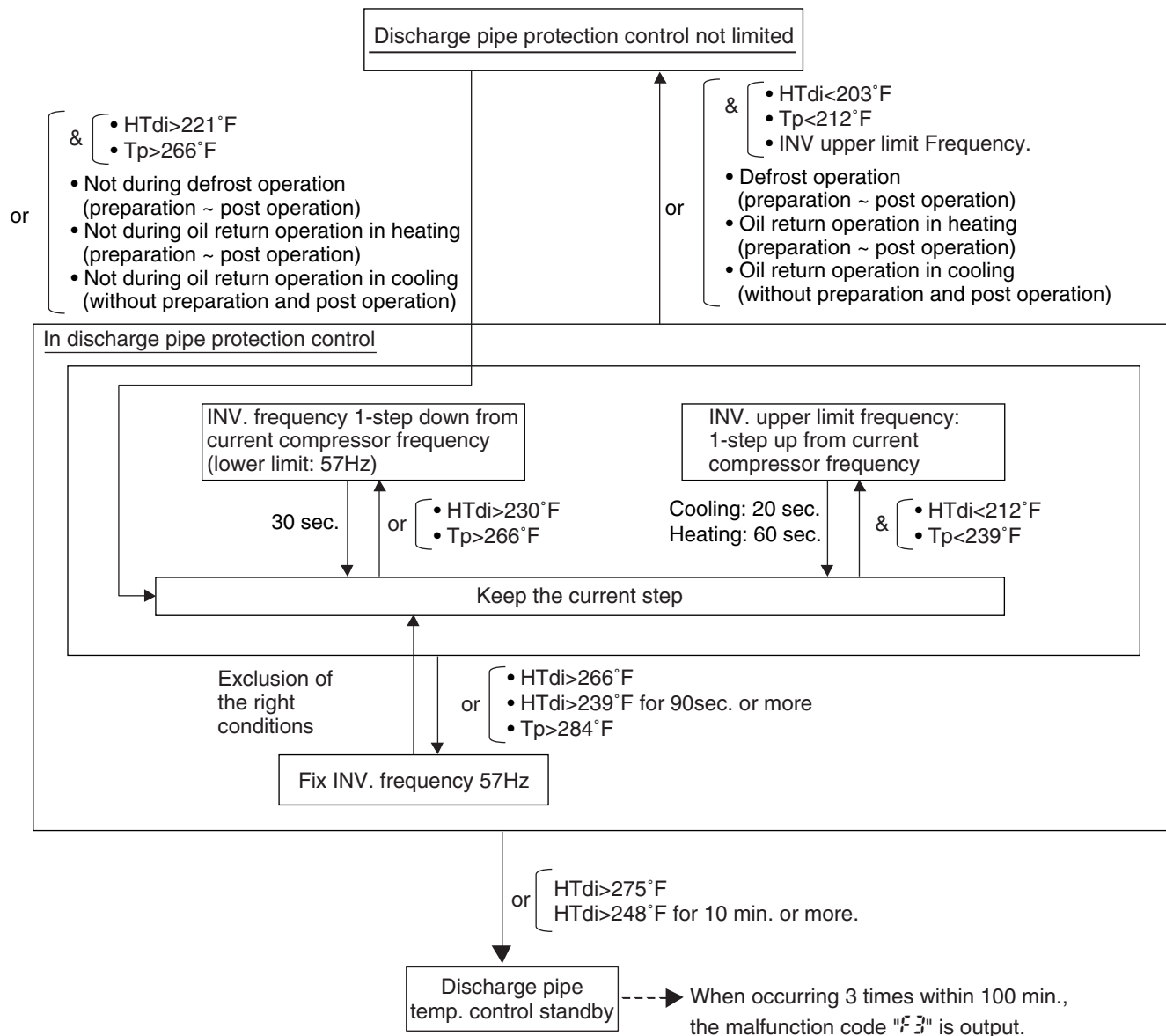
4.3 Discharge Pipe Protection Control

This discharge pipe protection control is used to protect the compressor internal temperature against a malfunction or transient increase of discharge pipe temperature.

[INV. compressor]

HTdi : Value of INV. compressor discharge pipe temperature (Tdi) compensated with outdoor air temperature

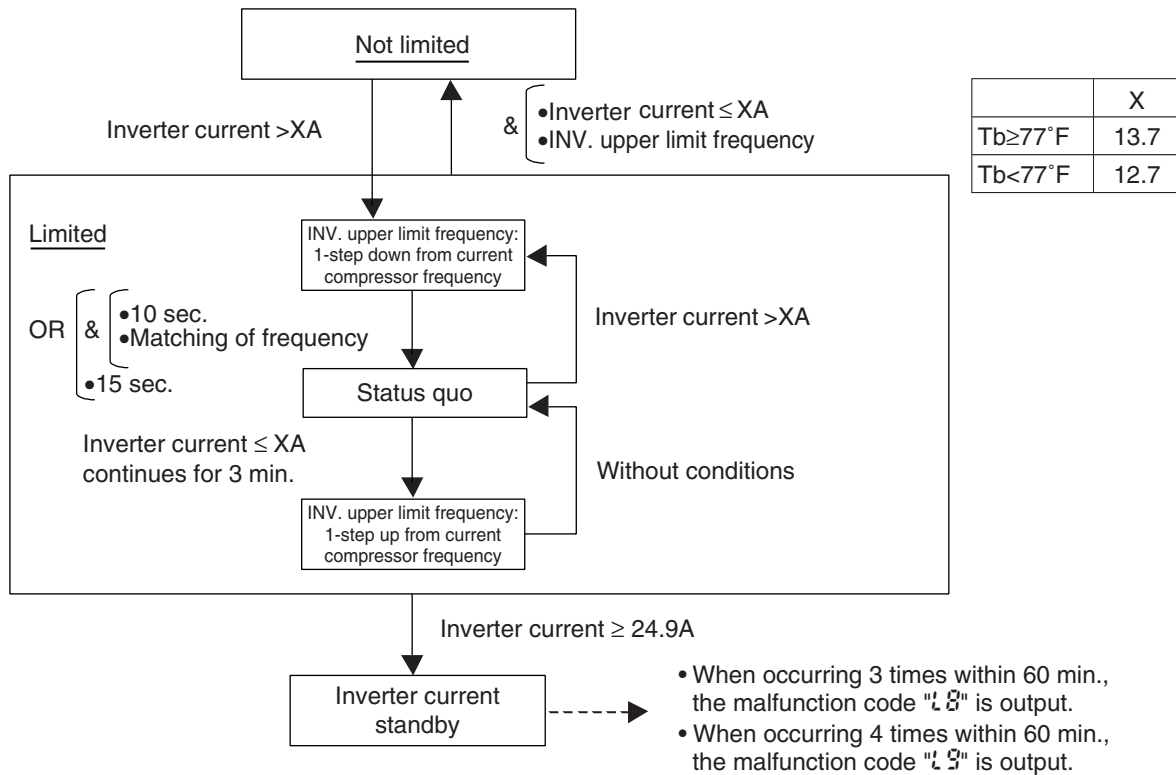
Tp : Value of compressor port temperature calculated by Tc and Te, and suction superheated degree.



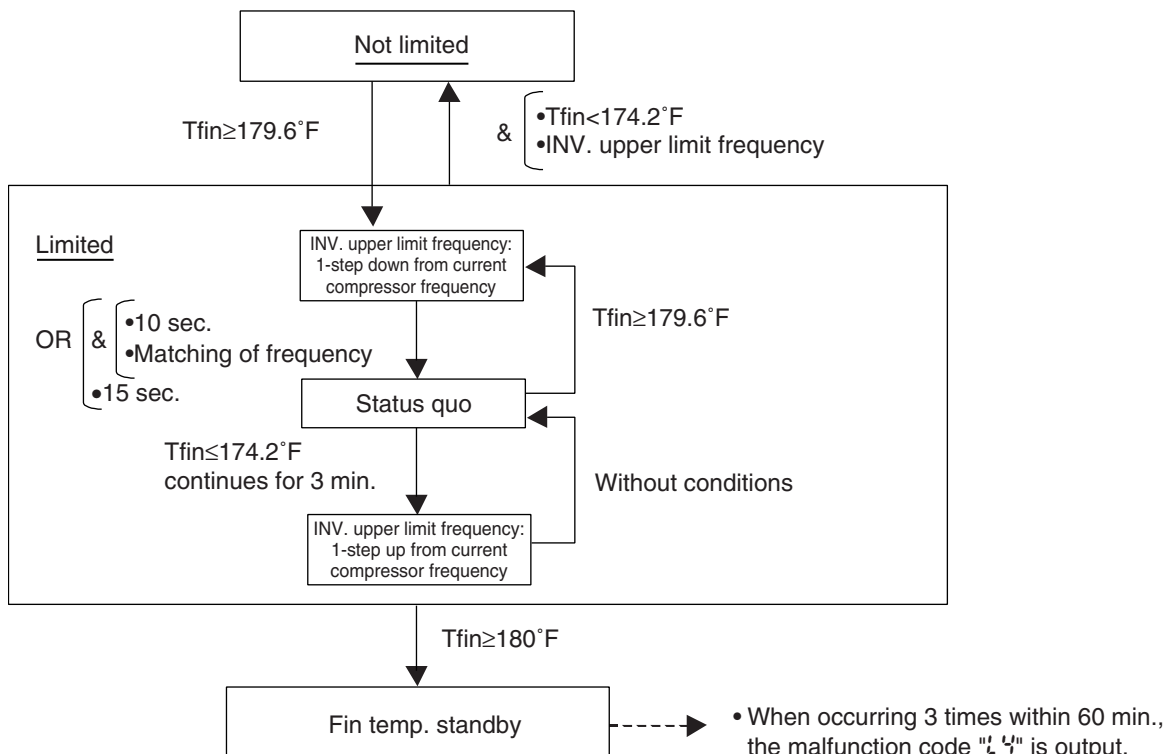
4.4 Inverter Protection Control

Inverter current protection control and inverter fin temperature control are performed to prevent tripping due to a malfunction, or transient inverter overcurrent, and fin temperature increase.

[Inverter overcurrent protection control]



[Inverter fin temperature control]



5. Other Control

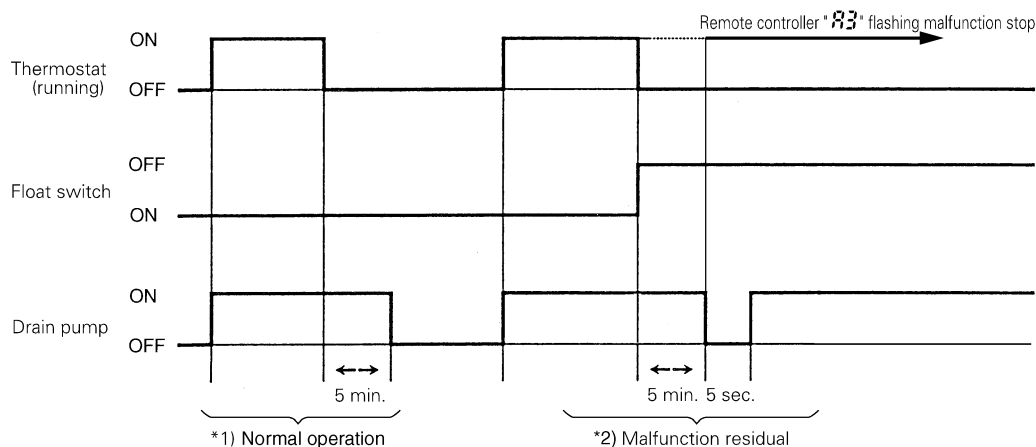
5.1 Heating Operation Prohibition

Heating operation is prohibited above 82°FDB outdoor air temperature. Outline of Control (Indoor Unit)

5.2 Drain Pump Control

- The drain pump is controlled by the ON/OFF buttons (4 button (1) - (4) given in the figure below).

5.2.1 When the Float Switch is Tripped While the Cooling Thermostat is ON:



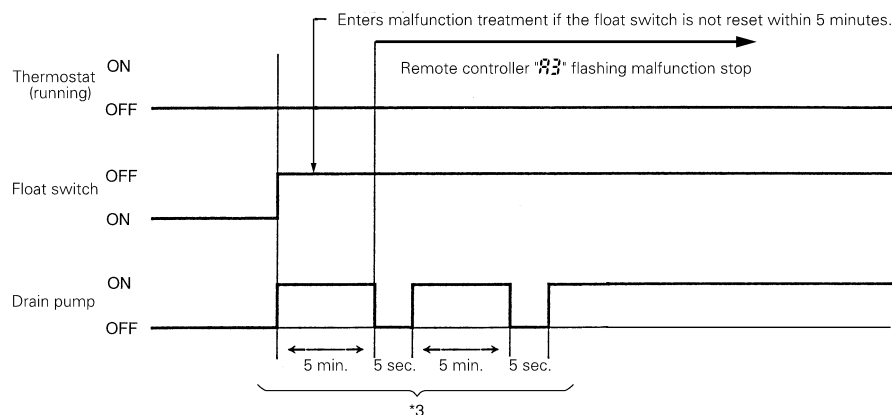
*1. (Normal operation):

The objective of residual operation is to completely drain any moisture adhering to the fin of the indoor unit heat exchanger when the thermostat goes off during cooling operation.

*2. (Malfunction residual):

The remote controller will display "A3" and the air conditioner will come to an abnormal stop in 5 minutes if the float switch is turned OFF while the cooling thermostat is ON.

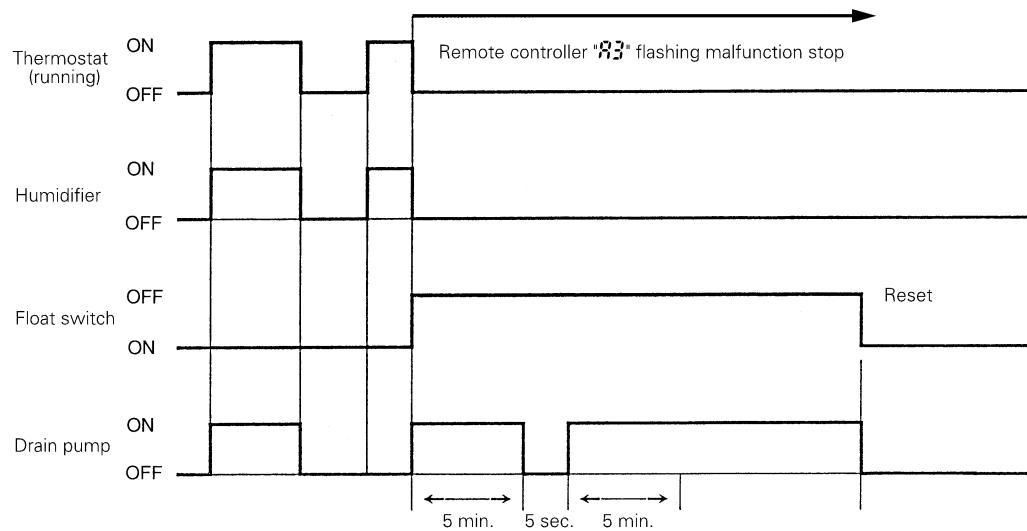
5.2.2 When the Float Switch is Tripped While the Cooling Thermostat is OFF:



*3. (Malfunction residual):

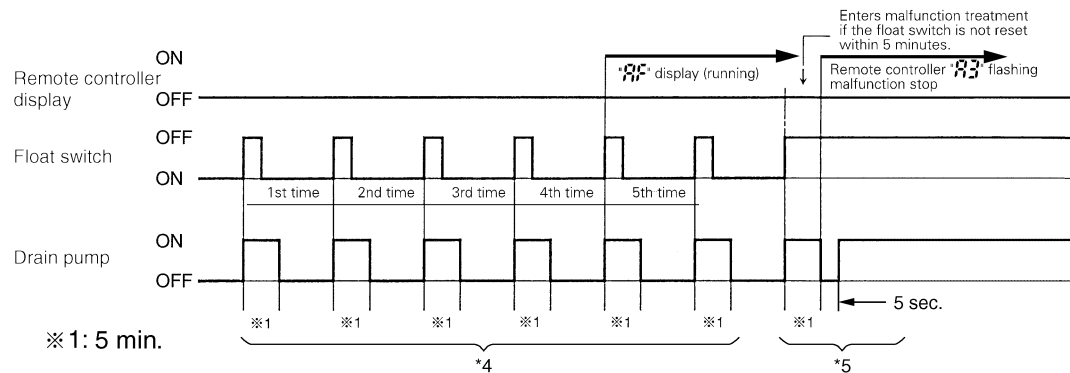
The remote controller will display "A3" and the air conditioner will come to an abnormal stop if the float switch is turned OFF and not turned ON again within 5 minutes while the cooling thermostat is OFF.

5.2.3 When the Float Switch is Tripped During Heating Operation:



During heating operation, if the float switch is not reset even after the 5 minutes operation, 5 seconds stop, 5 minutes operation cycle ends, operation continues until the switch is reset.

5.2.4 When the Float Switch is Tripped and "AF" is Displayed on the Remote Controller:



*4. (Malfunction residual):

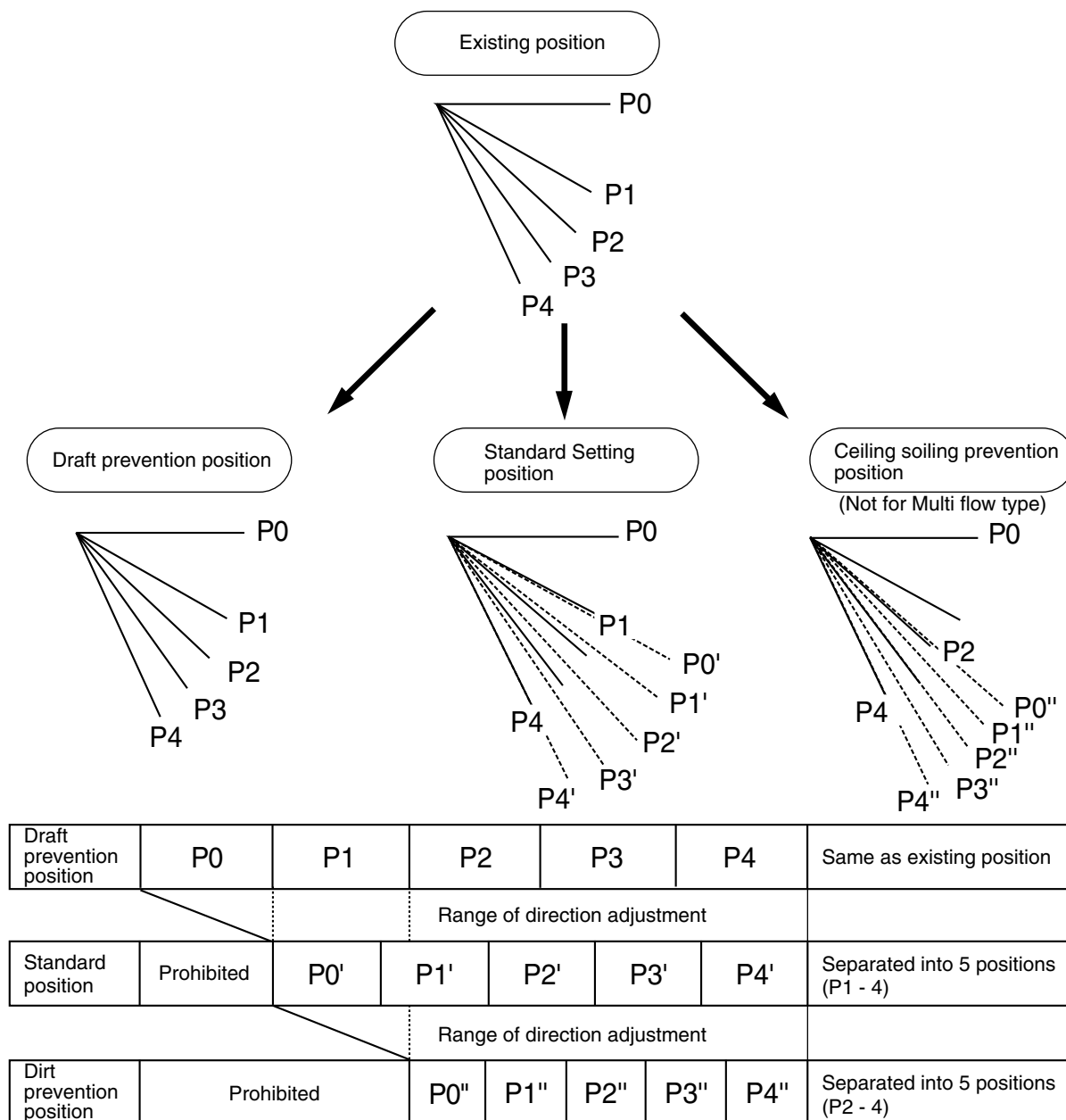
If the float switch is tripped five times in succession, a drain malfunction is determined to have occurred. "AF" is then displayed as operation continues.

*5. (Malfunction residual):

The remote controller will display "A3" and the air conditioner will come to an abnormal stop if the float switch is OFF for more than 5 minutes in the case of *4.

5.3 Louver Control for Preventing Ceiling Dirt

We have added a control feature that allows you to select the range of air direction and adjust it to prevent the ceiling surrounding the air discharge outlet of ceiling mounted cassette type units from being soiled.



The factory set position is the standard position.

5.4 Operation Range of Remote Controller Temperature Sensor

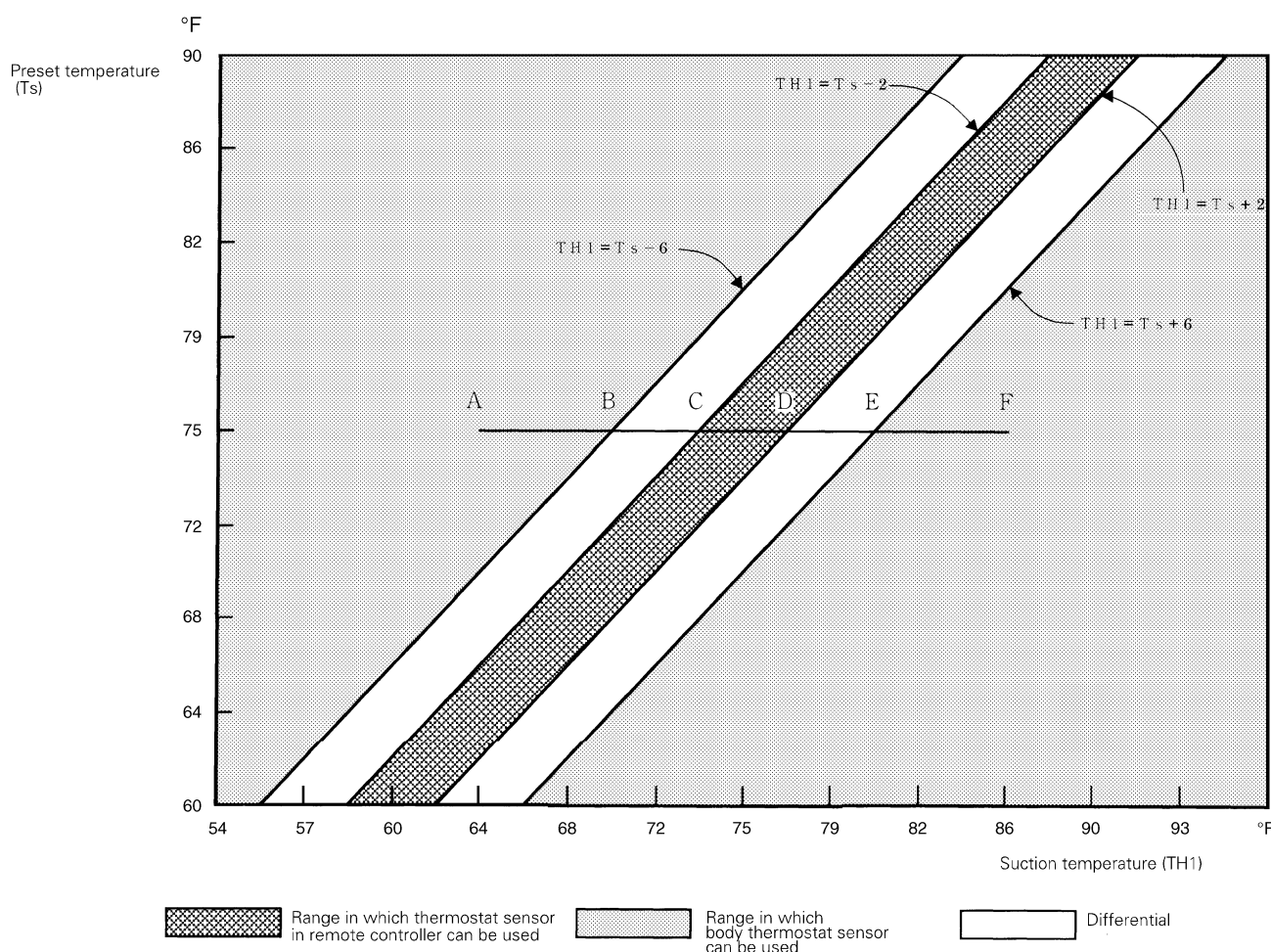
Room temperature is controlled by the remote controller temperature sensor and return-air temperature sensor (unit-mounted temperature sensor) on the indoor unit. When the remote controller temperature sensor is set to **Not Used** in a field setting, the unit can be controlled only by unit mounted temperature sensor (or remote sensor).



Note:

Cooling

When between the room temperature and the setpoint temperature, fine adjustment control can be achieved using the unit-mounted temperature sensor..If the return-air temperature is close to the set-point temperature, the sensor mounted in the remote controller in the occupied space is used.



■ Ex: When cooling

(This example also assumes there are several other air conditioners, the VRV system is off, and that temperature changes even when the thermostat sensor is off.)

Unit-mounted temperature sensor is used for temperatures from 64°F to 73°F (A → C).

Remote controller thermostat sensor is used for temperatures from 73°F to 81°F (C → E).

Unit-mounted temperature sensor is used for temperatures from 81°F to 86°F (E → F).

And, assuming return-air temperature has changed from 86°F to 64°F (F → A):

Unit-mounted temperature sensor is used for temperatures from 86°F to 77°F (F → D).

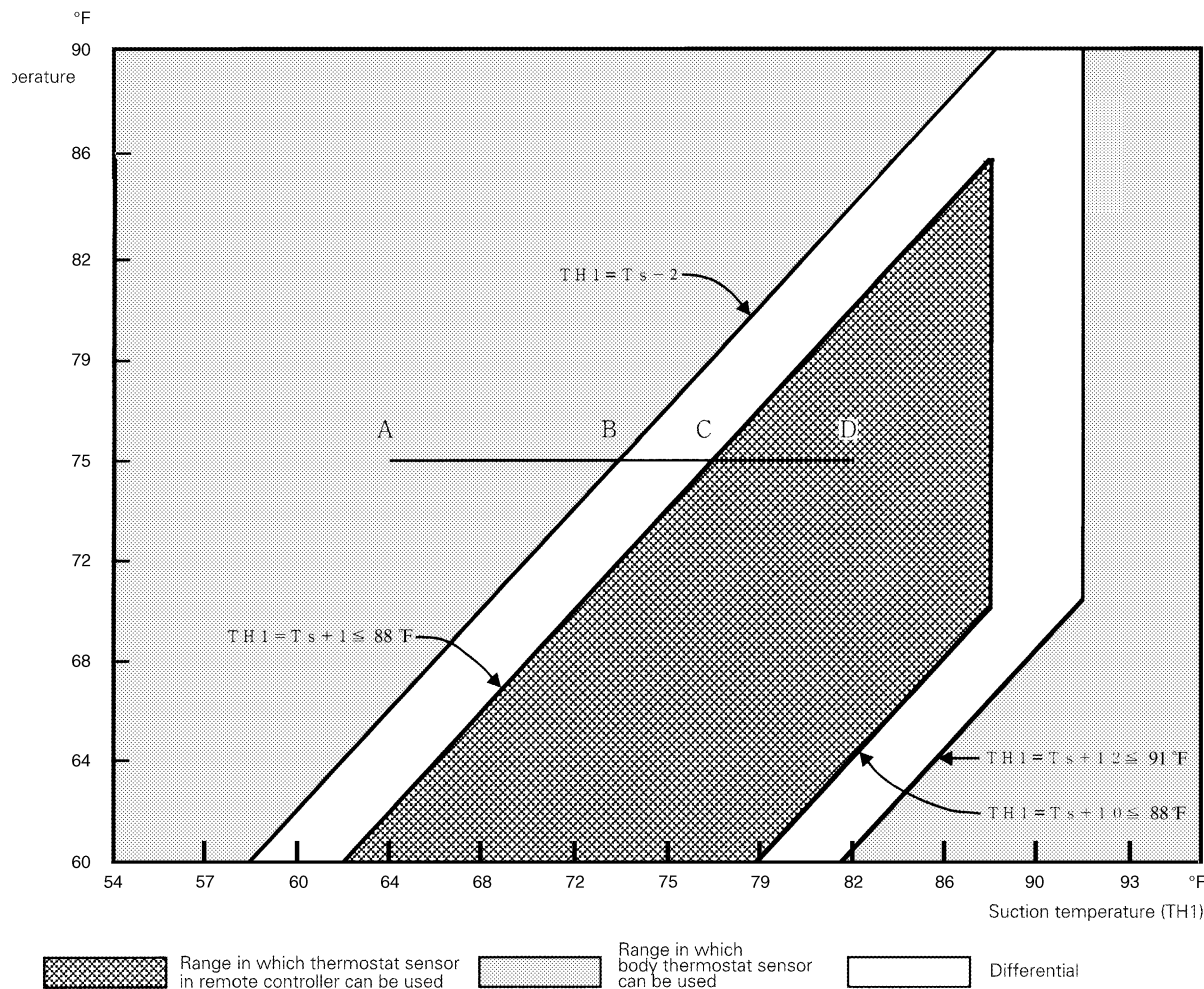
Remote controller thermostat sensor is used for temperatures from 77°F to 70°F (D → B).

Unit-mounted temperature sensor is used for temperatures from 70°F to 64°F (B → A).

NOTE: When outdoor air (OA) and indoor return air are mixed, the room temperature may differ from the set-point temperature because the air temperature is out of the area of *operation range of the remote controller temperature sensor*. In this event, install the remote sensor (KRCS01-1) in the room where there is no influence of outdoor air.

Heating

When heating, hot air rises to the top of the room which results in a lower temperature close to the floor where occupants are. This can cause the thermostat to turn off the unit before the lower part of the room reaches set-point temperature. To ensure a more evenly distributed temperature, position a Remote Sensor, at body level, in the occupied space or use the high ceiling installation service code.



(V2769)

■ Ex: When heating

Assuming the preset temperature in the figure above is 75°F, and the return-air temperature has changed from 64°F to 82°F (A → D):

(This example also assumes there are several other air conditioners, the VRV system is off, and that temperature changes even when the temperature sensor is off.)

Unit-mounted thermostat sensor is used for temperatures from 64°F to 77°F (A → C).

Remote controller temperature sensor is used for temperatures from 77°F to 82°F (C → D).

And, assuming return-air temperature has changed from 82°F to 64°F (D → A):

Remote controller temperature sensor is used for temperatures from 82°F to 73°F (D → B).

Unit-mounted temperature sensor is used for temperatures from 73°F to 64°F (B → A).

5.5 Freeze Prevention

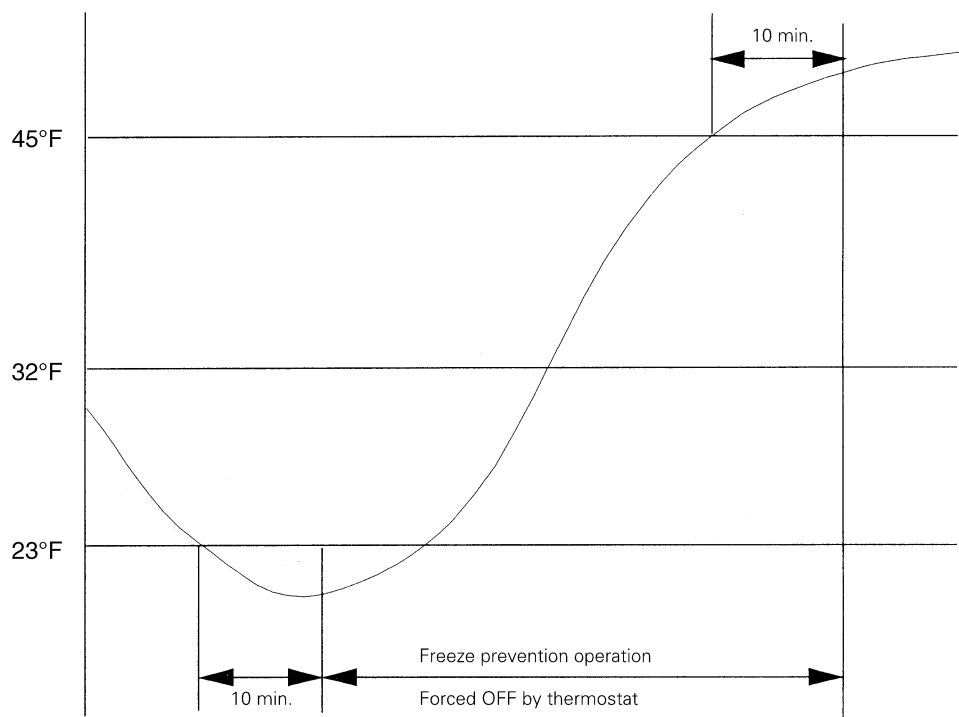
Freeze Prevention by Off Cycle (Indoor Unit)

When the temperature detected by the liquid pipe temperature thermistor (R2T) of the indoor unit heat exchanger drops too low, the unit enters freeze prevention operation in accordance with the following conditions, and is also set in accordance with the conditions given below.

Conditions for starting freeze prevention: Temperature is 30°F or less for total of 40 min., or temperature is 23°F or less for total of 10 min.

Conditions for stopping freeze prevention: Temperature is 45°F or more for 10 min. continuously.

Ex: Case where temperature is 23°F or less for total of 10 min.



5.6 View of Operations of Swing Flaps

Swing flaps work as following.

			Fan	Flap control		
				FCQ	FHQ	FAQ
Heating	Hot-start from defrosting	Swinging	OFF	Level	Level	Level
		Setting the wind direction	OFF	Level	Level	Level
	Defrosting	Swinging	OFF	Level	Level	Level
		Setting the wind direction	OFF	Level	Level	Level
	Thermostat is off	Swinging	LL	Level	Level	Level
		Setting the wind direction	LL	Level	Level	Level
	Hot-start from the state that the thermostat is off	Swinging	LL	Level	Level	Level
		Setting the wind direction	LL	Level	Level	Level
	Halt	Swinging	OFF	Level	Level	Level
		Setting the wind direction	OFF	Level	Level	Level
Cooling	Thermostat of microcomputer-dry is on	Swinging	L ^{*1}	Swinging	Swinging	Swinging
		Setting the wind direction	L ^{*1}	Set up	Set up	Set up
	Thermostat of microcomputer-dry is off	Swinging	OFF or L	Swinging	Swinging	Swinging
		Setting the wind direction		Set up	Set up	Set up
	Cooling thermostat is off	Swinging	Set up	Swinging	Swinging	Swinging
		Setting the wind direction	Set up	Set up	Set up	Set up
	Halt	Swinging	OFF	Level	Level	Level
		Setting the wind direction	OFF	Set up	Level	Level
	Microcomputer is controlled (including the cooling state)	Swinging	L	Swinging	Swinging	Swinging
		Setting the wind direction	L	Set up	Set up	Set up

* 1. Only in FCQ case, L or LL.

Part 6

Test Operation

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1. Test Operation

1.1 Procedure and Outline

Follow the following procedure to conduct the initial test operation after installation.

1.1.1 Check Work Prior to Turn Power Supply On

Check the below items.

- Power wiring
- Control transmission wiring between units
- Ground wire



Check on refrigerant piping



Check on amount of refrigerant charge

- Is the power supply single-phase 208-230V / 60Hz?
- Have you finished piping to the drain?
- Have you detached the transport brackets?
- Is the wiring installed as specified?
- Are the designated wires used?
- Is the grounding work completed?

Use a 500V megger tester to measure the insulation.

- Do not use a megger tester for other circuits than 200-230V circuit.
- Are the setscrews of the wiring tight?
- Is the electrical component box completely covered with an insulation cover?
- Is pipe size correct? (The design pressure of this product is 478 psi.)
- Are pipe insulation materials installed securely?
Liquid and gas pipes need to be insulated to prevent condensation.
- Are respective stop valves on liquid and gas lines fully open?
- Is refrigerant charged up to the specified amount?
If insufficient, charge the refrigerant from the service port of the stop valve on the liquid side with the outdoor unit in stop mode after turning power on.
- Has the amount of refrigerant charge been recorded on "Record Chart of Additional Refrigerant Charge Amount"?

1.1.2 Turn Power On

Turn outdoor unit power on.



Turn indoor unit power on.



Carry out field setting on outdoor P.C.B.

- Be sure to turn the power on 6 hours before starting operation to protect compressors.
- Close outside panels of the outdoor unit.

1.1.3 Check Operation

* During check operation, position the front panel in full view so as to avoid incorrect readings.*

Check operation is mandatory for normal unit operation.

(When the check operation is not executed, alarm code "U3" will be displayed.)

Press and hold the TEST button (BS4) on outdoor unit P.C.B. for 5 seconds.



Check on operation

- The test operation is started automatically.
- The following judgements are conducted within 15 minutes (about 30 minutes at the maximum).
 - Check for incorrect wiring.
 - Check that the stop valve is closed.
 - The system performs a self check to automatically determine pipe length.
- The following indications are conducted while in test operation.
 - LED lamp on outdoor unit P.C.B. — H2P flickers (test operation)
 - Remote controller — Indicates "Under Centralized Control" on upper right.

On completion of test operation, LED on outdoor unit P.C.B. displays the following.

H3P ON: Normal completion

H2P and H3P ON: Abnormal completion → Check the indoor unit remote controller for abnormal display and correct it.

(For normal completion)

(For abnormal completion)

H1P	H2P	H3P	H4P	H5P	H6P	H7P
●	●	○	●	●	●	●
●	○	○	●	●	●	●

Malfunction code

In case of an alarm code displayed on remote controller:

Malfunction code	Nonconformity during installation	Remedial action
E3	The shutoff valve of an outdoor unit is left closed.	Open the gas-side shutoff valve and the liquid-side shutoff valve.
	Refrigerant overcharge	Recalculate the required amount of refrigerant from the piping length and correct the refrigerant charge level by recovering any excessive refrigerant with a refrigerant recovery machine.
E4	The shutoff valve of an outdoor unit is left closed.	Open the gas-side shutoff valve and the liquid-side shutoff valve.
	Insufficient refrigerant	Check if the additional refrigerant charge has been finished correctly.
		Recalculate the required amount of refrigerant from the piping length and add an adequate amount of refrigerant.
F3	Refrigerant overcharge	Recalculate the required amount of refrigerant from the piping length and correct the refrigerant charge level by recovering any excessive refrigerant with a refrigerant recovery machine.
	The shutoff valve of an outdoor unit is left closed.	Open the gas-side shutoff valve and the liquid-side shutoff valve.
	Insufficient refrigerant	Check if the additional refrigerant charge has been finished correctly.
		Recalculate the required amount of refrigerant from the piping length and add an adequate amount of refrigerant.
F6	Refrigerant overcharge	Recalculate the required amount of refrigerant from the piping length and correct the refrigerant charge level by recovering any excessive refrigerant with a refrigerant recovery machine.
U2	Insufficient supply voltage	Check to see if the supply voltage is supplied properly.
U3	If a check operation has not been performed.	Perform a check operation.

U4	No power is supplied to the outdoor unit.	Turn the power on for the outdoor unit.
U5	The shutoff valve of an outdoor unit is left closed.	Open the gas-side shutoff valve and the liquid-side shutoff valve.
	If the right indoor unit piping and wiring are not properly connected to the outdoor unit.	Make sure that the right indoor unit piping and wiring are properly connected to the outdoor unit.
U6	If the interunit wiring has not be connected or it has shorted.	Make sure the interunit wiring is correctly attached to terminals (X2M) F1/F2 (TO IN/D UNIT) on the outdoor unit circuit board.

1.1.4 Confirmation on Normal Operation

- Conduct normal unit operation after the check operation has been completed.
(When outdoor air temperature is 82°FDB or higher, the unit can not be operated with heating mode. See the installation manual attached.)
- Confirm that the indoor/outdoor units can be operated normally.
When an abnormal noise due to liquid compression by the compressor can be heard, stop the unit immediately, and turn on the crankcase heater to heat up it sufficiently, then start operation again.
- Operate indoor unit to check that the corresponding outdoor unit operates.
- Confirm that the indoor unit discharges cold air (or warm air).
- Operate the air direction control button and flow rate control button to check the function of the devices.

1.2 Operation when Power is Turned On

1.2.1 When Turning On Power First Time

The unit cannot be run for up to 12 minutes to automatically set the master power and address (indoor-outdoor address, etc.).

Status

Outdoor unit

Test lamp H2P Blinks

Can also be set during operation described above.

Indoor unit

If ON button is pushed during operation described above, the "UH" malfunction indicator blinks.
(Returns to normal when automatic setting is complete.)

1.2.2 When Turning On Power the Second Time and Subsequent

Tap the RESET(BS5) button on the outdoor unit P.C.B. Operation becomes possible for about 2 minutes. If you do not push the RESET button, the unit cannot be run for up to 10 minutes to automatically set master power.

Status

Outdoor unit

Test lamp H2P Blinks

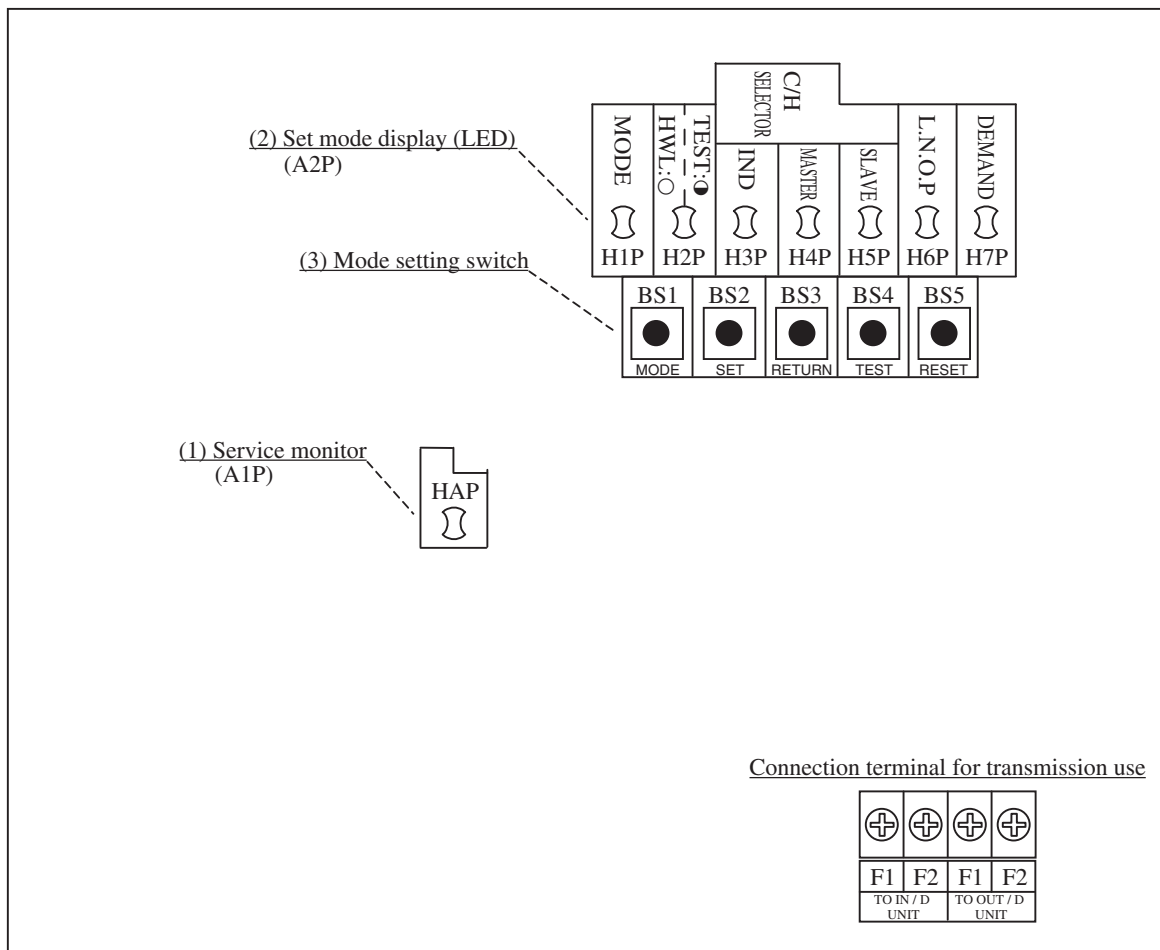
Can also be set during operation described above.

Indoor unit

If ON button is pushed during operation described above, the operation lamp lights but the compressor does not operate. (Returns to normal when automatic setting is complete.)

2. Outdoor Unit P.C.B. Layout

Outdoor unit P.C.B.



- (1) Service monitor (LED Green)
This monitor blinks while in normal operation, and turns on or off when a malfunction occurs.
- (2) Set mode display (LED Orange)
LEDs display mode according to the setting.
- (3) Mode setting switch
Used to change mode.

3. Field Setting

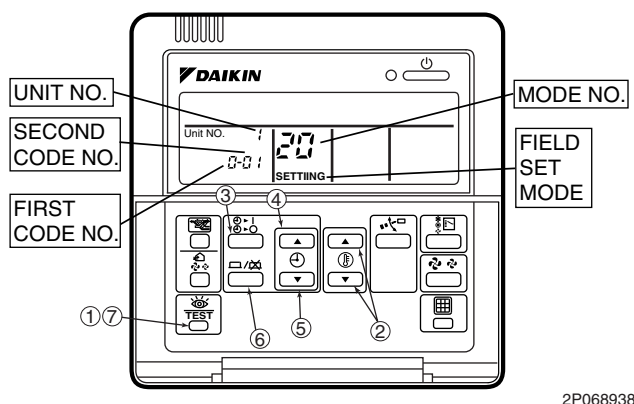
3.1 Field Setting from Remote Controller

Individual functions of indoor unit can be changed from the remote controller. At the time of installation or after service inspection / repair, make the local setting in accordance with the following description.

An incorrect setting may cause malfunction.

3.1.1 Wired Remote Controller <BRC1D71>

If optional accessories are mounted on the indoor unit, the indoor unit setting may have to be changed. Refer to the instruction manual for each optional accessory.



2P068938

1. When in the normal mode, push the “” button (①) for 4 seconds or more, and the FIELD SET MODE is entered.
2. Select the desired MODE NO. with the “” button (②).
3. During group control, when setting by each indoor unit (mode No. 20, 22 and 23 have been selected), push the “” button (③) and select the INDOOR UNIT NO. to be set. (This operation is unnecessary when setting by group.)
4. Push the “” upper button (④) and select FIRST CODE NO.
5. Push the “” lower button (⑤) and select the SECOND CODE NO.
6. Push the “” button (⑥) once and the present settings are SET.
7. Push the “” button (⑦) to return to the NORMAL MODE.

■ Example

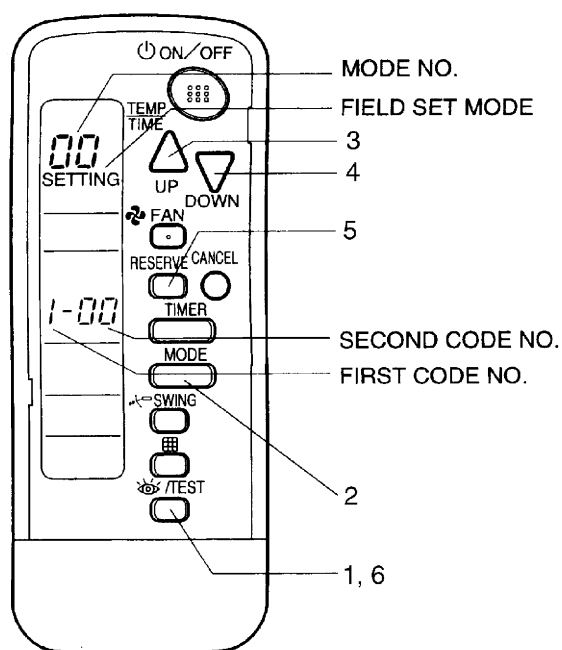
When setting the filter sign time to “Filter Contamination Heavy” in all group unit setting, set the Mode No. to “10”, first code No. to “0” and second code No. to “02”.

3.1.2 Wireless Remote Controller - Indoor Unit

BRC7C812

BRC7E83

BRC7E818



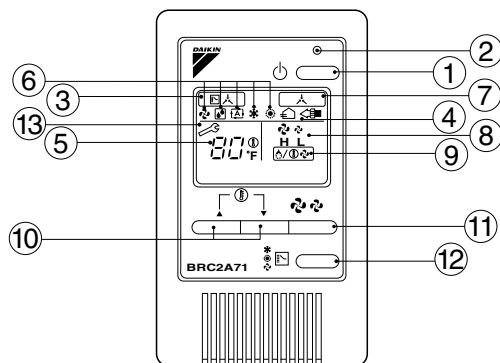
1. When in the normal mode, push the **TEST** button for 4 seconds or more, and operation then enters the "field set mode."
2. Select the desired "mode No." with the **MODE** button.
3. Pushing the **UP** button, select the first code No.
4. Pushing the **DOWN** button, select the second code No.
5. Push the timer **RESERVE** button and check the settings.
6. Push the **TEST** button to return to the normal mode.

(Example)

When setting the filter sign time to "Filter Contamination-Heavy" in all group unit setting, set the Mode No. to "10", Mode setting No. to "0" and setting position No. to "02".

3.1.3 Simplified Remote Controller

BRC2A71



REMOTE CONTROLLER: NAME AND FUNCTION OF EACH SWITCH AND DISPLAY

①	ON/OFF BUTTON	⑦	DISPLAY “” (UNDER CENTRALIZED CONTROL)
	Press the button and the system will start. Press the button again and the system will stop.		When this display shows, the system is UNDER CENTRALIZED CONTROL. (This is not a standard specification)
②	OPERATION LAMP (RED)	⑧	DISPLAY “” (FAN SPEED)
	The lamp lights up during operation. Blinks in case of stop due to malfunction.		This display shows the fan speed: HIGH or LOW.
③	DISPLAY “” (CHANGEOVER UNDER CONTROL)	⑨	DISPLAY “” (DEFROST / HOT START)
	It is impossible to changeover heating/cooling with the remote controller when it shows this display. (As for details, see “SETTING OF MASTER REMOTE CONTROLLER” in the installation manual attached to the indoor unit.)		Indicates that defrost or hot start (during which the fan is stopped till the temperature of air supply rises enough at the start of a heating operation) is in progress.
④	DISPLAY “” (VENTILATION/AIR CLEANING)	⑩	TEMPERATURE SETTING BUTTON
	This display shows that the total heat exchanger and the air cleaning unit are in operation. (These are optional accessories).		Use this button for SETTING TEMPERATURE of the thermostat. ▲ ; Each press raises the set temperature by 1°F. ▼ ; Each press lowers the set temperature by 1°F. The variable temperature range is between 60°F and 90°F.
⑤	DISPLAY “” (SET TEMPERATURE)	⑪	FAN SPEED CONTROL BUTTON
	This display shows the set temperature. Only given during a cooling or heating operation.		Press this button to select the fan speed, HIGH or LOW, of your choice.
⑥	DISPLAY “” “” “” “” “” “” (OPERATION MODE)	⑫	OPERATION MODE SELECTOR BUTTON
			Press this button to select OPERATION MODE.
	This display shows current OPERATION MODE. “  ” is not available with outdoor units specially designed for cooling only. “  ” is reserved only for outdoor units capable of heat recovery.	⑬	DISPLAY “” (MALFUNCTION)
			Indicates malfunction and blinks if the unit stops operating due to malfunction. (As for details, see “TROUBLE SHOOTING” in the operation manual attached to the outdoor unit.)

For the sake of explanation, all indications are shown in the figure above contrary to actual running situations.

3P146204

3.1.4 Setting Contents and Code No. – VRV Unit

Field Setting Contents and Code No.

Mode No. Note)2	FIRST CODE No.	Description of Setting		SECOND CODE NO. Note)3			
				01	02	03	04
10(20)	0	Filter Contamination-Heavy/ Light (Setting for display time to clean air filter) (Sets display time to clean air filter to half when there is heavy filter contamination.)	Ultra-Long-Life Type	Light Approx. 10,000 hours	Heavy Approx. 5,000 hours	—	—
			Long-Life Type	Approx. 2,500 hours	Approx. 1,250 hours		
			Standard Type	Approx. 200 hours	Approx. 100 hours		
	1	Long-life filter type (Setting of filter sign indication time) (Change setting when Ultra-long-life filter is installed)		Long-Life Filter	Ultra-Long- Life Filter	—	—
	2	Thermostat Sensor in Remote Controller		Use	Not Use	—	—
12(22)	3	Display Time to Clean Air Filter Calculation (Set when filter sign is not to be displayed)		Display	Do not Display	—	—
	0	Optional accessories output selection (field selection of output for adapter for wiring)		Indoor Unit Turned ON by Thermostat	—	Operation Output	Malfunction Output
	1	ON/OFF Input from Outside (Set when ON/OFF is to be controlled from outside.)		Forced Off	ON/OFF Control	External Protection Device Input	—
	2	Thermostat Differential Changeover (Set when remote sensor is to be used.) FCQ only		2°F	1°F	—	—
	5	Power failure automatic reset (Auto Restart)		No equipped	Equipped	—	—
13(23)	4	Field set air flow position setting		Draft Prevention	Standard	Ceiling Soiling Prevention	—
	5	Field set fan speed selection (fan speed control by air discharge outlet for phase control)		Standard	Optional Accessory 1	Optional Accessory 2	—



Notes:

- Settings are made simultaneously for the entire group, however, if you select the mode No. inside parentheses, you can also set by each individual unit. Setting changes however cannot be checked except in the individual mode for those in parentheses.
- The mode numbers inside parentheses cannot be used by wireless remote controllers, so they cannot be set individually. Setting changes also cannot be checked.
- Marked are factory set.
- Do not make settings other than those described above. Nothing is displayed for functions the indoor unit is not equipped with.
- “” may be displayed to indicate the remote controller is resetting when returning to the normal mode.

3.1.5 Applicable Range of Field Setting

Mode No.	Setting Switch No.	Setting Contents	Ceiling mounted cassette type (Multi flow)	Ceiling suspended type	Wall mounted type
			FCQ	FHQ	FAQ
10 (20)	0	Filter sign	○	○	○
	1	Ultra long life filter sign	○	—	—
	2	Remote controller thermostat sensor	○	○	○
12 (22)	3	Set fan speed when thermostat OFF	○	○	○
13 (23)	0	Airflow adjustment Ceiling height	○	○	—
	1	Airflow direction	○	—	—
	3	Airflow direction adjustment (Down flow operation)	—	—	—
	4	Airflow direction adjustment range	○	—	—
	5	Field set fan speed selection	—	—	—

○ = Available

— = Not Available

3.1.6 Detailed Explanation of Setting Modes

Filter Sign Setting

If switching the filter sign ON time, set as given in the table below.

Set Time

Filter Specs. Setting	Mode No.	Setting Switch No.	Setting Position No.	Lighting interval of the filter sign (hours)		
				Standard	Long Life	Ultra Long Life Filter
Contamination Light	10(20)	0	01	200 hrs.	2,500 hrs.	10,000 hrs.
Contamination Heavy			02	100 hrs.	1,250 hrs.	5,000 hrs.

Fan Speed Changeover When Thermostat is OFF

By setting to **Set Fan Speed**, you can switch the fan speed to the set fan speed when the heating thermostat is **OFF**.

* Since there is concern about draft if using **Fan speed up when thermostat is OFF**, you should take the setup location into consideration.

On warming, the priority is given to **Fan speed up when thermostat is OFF** over **Airflow OFF on thermostat OFF**.

©This is used to correspond with the improvement of the electrical collection capability.

Setting Table

Mode No.	First Code No.	Second Code No.	Setting
12(22)	3	01	LL Fan Speed
		02	Set Fan Speed

Auto Restart after Power Failure Reset

For the air conditioners with no setting for the function (same as factory setting), the units will be left in the stop condition when the power supply is reset automatically after power failure reset or the main power supply is turned on again after once turned off. However, for the air conditioners with the setting, the units may start automatically after power failure reset or the main power supply turned on again (return to the same operation condition as that of before power failure).

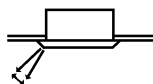
For the above reasons, when the unit is set enabling to utilize **Auto Restart Function after Power Failure Reset**, utmost care should be paid for the occurrence of the following situation.



- Caution**
1. The air conditioner starts operation suddenly after power failure reset or the when the main power supply turned on again, and the user should be informed about this.
 2. When servicing, turn off the main power switch to stop operation and after completion of service, turn the switch on again to restart it.

Setting of Airflow Direction Adjustment Range

Make the following air flow direction setting according to the respective purpose.



Setting Table

Mode No.	First Code No.	Second Code No.	Setting
13 (23)	4	01	Upward (Draft prevention)
		02	Standard
		03	Downward (Ceiling soiling prevention)

3.1.7 Setting of Operation Control Mode from Remote Controller (Local Setting)

The operation control mode is compatible with a variety of controls and operations by limiting the functions of the operation remote controller. Furthermore, operations such as remote controller ON/OFF can be limited in accordance with the combination conditions. Refer to information in the table on the following page.

The centralized controller is normally available for operations. (Except when the centralized monitor is connected.)

3.1.8 Contents of Control Modes

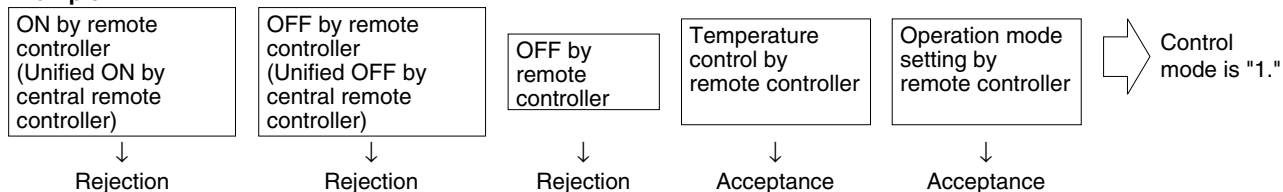
Twenty modes consisting of combinations of the following five operation modes with temperature and operation mode setting by remote controller can be set and displayed by operation modes 0 through 19.

- ◆ ON/OFF control impossible by remote controller
Used when you want to turn on/off by central remote controller only.
(Cannot be turned on/off by remote controller.)
- ◆ OFF control only possible by remote controller
Used when you want to turn on by central remote controller only, and off by remote controller only.
- ◆ Centralized
Used when you want to turn on by central remote controller only, and turn on/off freely by remote controller during set time.
- ◆ Individual
Used when you want to turn on/off by both central remote controller and remote controller.
- ◆ Timer operation possible by remote controller
Used when you want to turn on/off by remote controller during set time and you do not want to start operation by central remote controller when time of system start is programmed.

How to Select Operation Mode

Whether operation by remote controller will be possible or not for turning on/off, controlling temperature or setting operation mode is selected and decided by the operation mode shown in the right column of the following table.

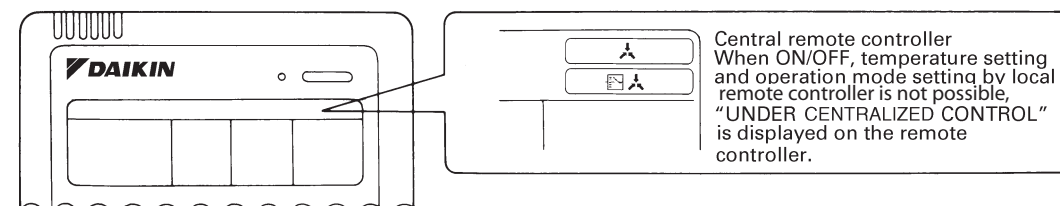
Example



Control mode	Control by remote controller					Control mode	
	Operation		OFF	Temperature control	Operation mode setting		
	Unified operation, individual operation by central remote controller, or operation controlled by timer	Unified OFF, individual stop by central remote controller, or timer stop					
ON/OFF control impossible by remote controller	Rejection (Example)	Rejection (Example)	Rejection (Example)	Rejection	Acceptance	0	
					Rejection	10	
					Acceptance (Example)	Acceptance (Example)	1(Example)
OFF control only possible by remote controller					Rejection	11	
					Acceptance	2	
					Rejection	12	
					Acceptance	3	
					Rejection	13	
Centralized	Acceptance				Rejection	Acceptance	4
					Rejection	14	
					Acceptance	Acceptance	5
					Rejection	15	
Individual		Acceptance		Rejection	Acceptance	6	
				Rejection	16		
				Acceptance	Acceptance	7 *1	
				Rejection	17		
Timer operation possible by remote controller	Acceptance (During timer at ON position only)	Rejection (During timer at OFF position)		Rejection	Acceptance	8	
					Rejection	18	
					Acceptance	Acceptance	9
					Rejection	19	

Do not select "timer operation possible by remote controller" if not using a remote controller. Operation by timer is impossible in this case.

*1. Factory setting



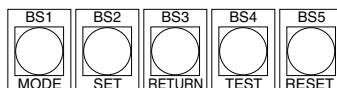
3.2 Field Setting from Outdoor Unit

3.2.1 Setting by push-button switches

The following settings are made by pushbutton switches on P.C.B.

	H1P	H2P	H3P	H4P	H5P	H6P	H7P
LED display	●	●	○	●	●	●	●

(Factory setting)



There are the following three setting modes.

① **Setting mode 1 (H1P off)**

Initial status (when normal) : Also indicates during “abnormal”.

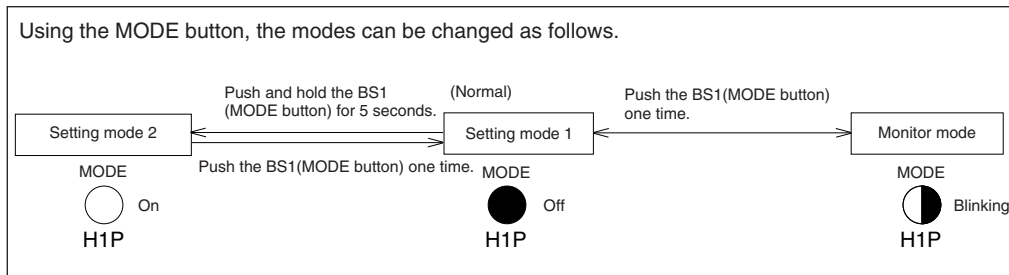
② **Setting mode 2 (H1P on)**

Used to modify the operating status and to set program addresses, etc. Usually used in servicing the system.

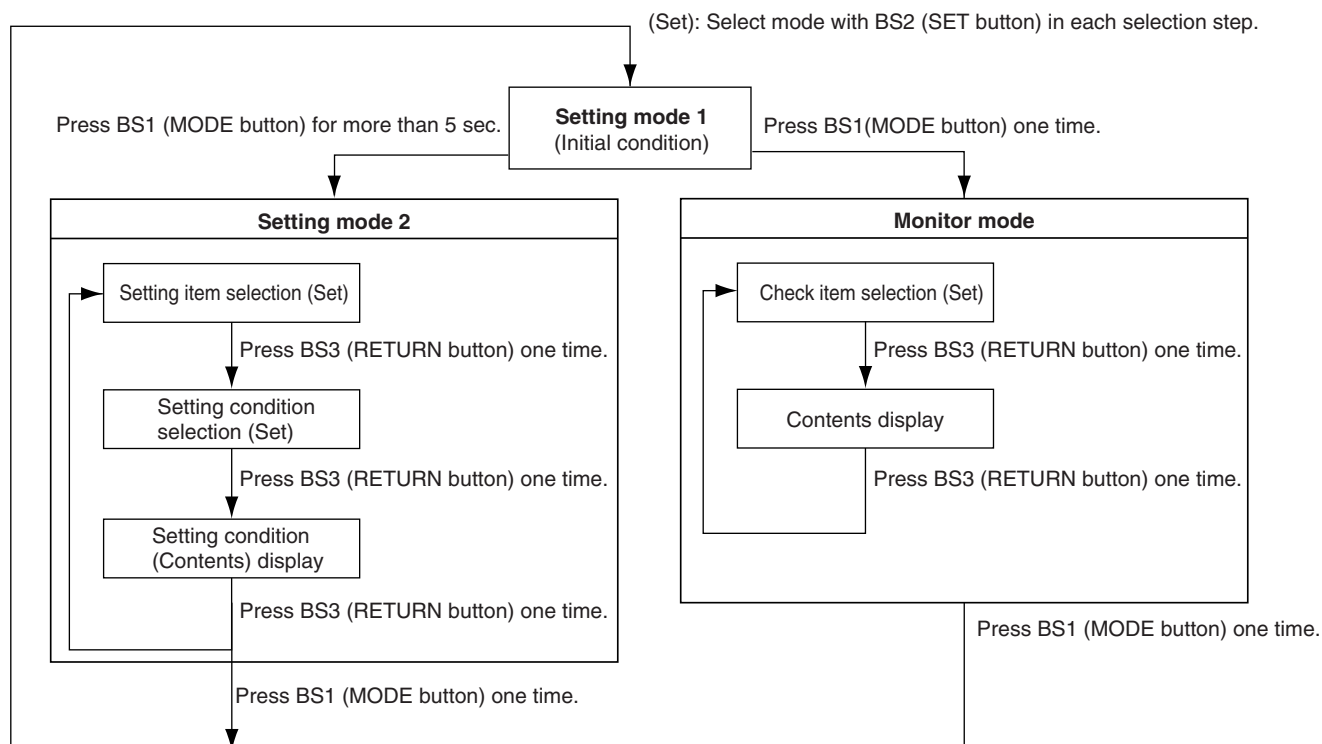
③ **Monitor mode (H1P blinks)**

Used to check the program made in Setting mode 2.

■ Mode changing procedure



■ Mode changing procedure



a. “Setting mode 1”

Normally, “Setting mode 1” is set. In case of other status, push MODE button (BS1) one time and set to “Setting mode 1”.

* The current state is displayed.

Display for malfunction/preparing/test-run

Setting (displaying) item	LED display example						
	H1P	H2P	H3P	H4P	H5P	H6P	H7P
Normal	●	●	○	●	●	●	●
Malfunction	●	○	○	●	●	●	●
Preparing/Test-run	●	◐	○	●	●	●	●

○: ON ●: OFF ◐: Blink

b. "Setting mode 2"

Push and hold the MODE button (BS1) for 5 seconds and set to "Setting mode 2".

<Selection of setting items>

Push the SET button (BS2) and set the LED display to a setting item shown in the table on the right.

Push the RETURN button (BS3) and decide on the item. (The present setting condition is blinking.)

<Selection of setting conditions>

Push the SET button (BS2) and set to the setting condition you want.

Push the RETURN button (BS3) and decide the condition.

Push the RETURN button (BS3) and set to the initial status of "Setting mode 2".

No.	Setting item	Description
5	Indoor unit forced fan H	Allows forced operation of indoor unit fan while unit is stopped. (H tap)
6	Indoor unit forced operation	Allows forced operation of indoor unit.
8	Te setting	Target evaporation temperature for cooling
9	Tc setting	Target condensation temperature for heating
10	Defrost changeover setting	Changes the temperature condition for defrost and sets to quick defrost or slow defrost.
12	External low noise setting / Demand setting	Reception of external low noise or demand signal
21	Refrigerant recovery / vacuuming mode setting	Sets to refrigerant recovery / vacuuming mode.
22	Night-time low noise setting	Sets automatic nighttime low noise operation in a simple way. The operating time is based on "Starting set" and "Ending set".
26	Night-time low noise operation start setting	Sets starting time of nighttime low noise operation. (Night-time low noise setting is also required.)
27	Night-time low noise operation end setting	Sets ending time of nighttime low noise operation. (Night-time low noise setting is also required.)
29	Capacity precedence setting	If the capacity control is required, the low noise control is automatically activated by this setting.
30	Demand setting 1	Changes target value of power consumption when demand control 1 is input.
32	Normal demand setting	Normally enables demand control 1 without external input. Effective to prevent a problem that circuit breaker of small capacity is shut down due to large load.

* If you become unsure of how to proceed, push the MODE button (BS1) and return to setting mode 1.

○: ON ●: OFF ◐: Blink

No.	Setting item display								Setting condition display	
	Setting item	MODE H1P	TEST H2P	C/H selection			Low noise H6P	Demand H7P		
				IND H3P	Master H4P	Slave H5P			* Factory set	
5	Indoor unit forced fan H	☐	☒	☒	☒	☐	☒	☐	Normal operation Indoor forced fan H	☐ ●●●●●●●● ☐ *
6	Indoor unit forced operation	☐	☒	☒	☒	☐	☐	☒	Normal operation Indoor forced operation	☐ ●●●●●●●● ☐ *
8	Te setting	☐	☒	☒	☐	☒	☒	☒	High Normal Low	☐ ●●●●●●●● ☐ ●●●●●●●● ☐ ●●●●●●●● ☐ *
9	Tc setting	☐	☒	☒	☐	☒	☒	☐	High Normal Low	☐ ●●●●●●●● ☐ ●●●●●●●● ☐ ●●●●●●●● ☐ *
10	Defrost changeover setting	☐	☒	☒	☐	☒	☐	☒	Quick defrost Normal Slow defrost	☐ ●●●●●●●● ☐ ●●●●●●●● ☐ ●●●●●●●● ☐ *
12	External low noise setting / Demand setting	☐	☒	☒	☐	☐	☒	☒	External low noise/demand: NO External low noise/demand: YES	☐ ●●●●●●●● ☐ ●●●●●●●● ☐ *
21	Refrigerant recovery / vacuuming mode setting	☐	☒	☐	☒	☐	☒	☐	Refrigerant recovery/ vacuuming: OFF Refrigerant recovery/ vacuuming: ON	☐ ●●●●●●●● ☐ * ☐ ●●●●●●●● ☐ ●
22	Night-time low noise setting	☐	☒	☐	☒	☐	☐	☒	OFF Level 1 Level 2 Level 3	☐ ●●●●●●●● ☐ * ☐ ●●●●●●●● ☐ ● ☐ ●●●●●●●● ☐ ● ☐ ●●●●●●●● ☐ ●●
26	Night-time low noise start setting	☐	☒	☐	☐	☒	☐	☒	About PM 8:00 About PM 10:00 About PM 0:00	☐ ●●●●●●●● ☐ ● ☐ ●●●●●●●● ☐ ●●* ☐ ●●●●●●●● ☐ ●●
27	Night-time low noise end setting	☐	☒	☐	☐	☒	☐	☐	About AM 6:00 About AM 7:00 About AM 8:00	☐ ●●●●●●●● ☐ ● ☐ ●●●●●●●● ☐ ●● ☐ ●●●●●●●● ☐ ●●●*
29	Capacity precedence setting	☐	☒	☐	☐	☐	☒	☐	OFF ON	☐ ●●●●●●●● ☐ * ☐ ●●●●●●●● ☐ ●
30	Demand setting 1	☐	☒	☐	☐	☐	☐	☒	60 % demand 70 % demand 80 % demand	☐ ●●●●●●●● ☐ ● ☐ ●●●●●●●● ☐ ●●* ☐ ●●●●●●●● ☐ ●●
32	Normal demand setting	☐	☐	☒	☒	☒	☒	☒	OFF ON	☐ ●●●●●●●● ☐ * ☐ ●●●●●●●● ☐ ●

○: ON ●: OFF ◐: Blink

c. Monitor mode

To enter the monitor mode, push the MODE button (BS1) when in "Setting mode 1".

<Selection of setting item>

Push the SET button (BS2) and set the LED display to a setting item.

<Confirmation on setting contents>

Push the RETURN button (BS3) to display different data of set items.

Push the RETURN button (BS3) and switches to the initial status of "Monitor mode".

* Push the MODE button (BS1) and returns to "Setting mode 1".

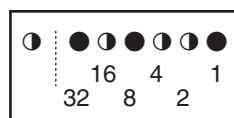
No.	Setting item	LED display							Data display
		H1P	H2P	H3P	H4P	H5P	H6P	H7P	
0	Various settings	◐	●	●	●	●	●	●	See below
5	Number of connected indoor units	◐	●	●	●	○	●	○	Lower 6 digits
14	Contents of malfunction (the latest)	◐	●	●	○	○	○	●	Malfunction code table
15	Contents of malfunction (1 cycle before)	○	●	●	○	○	○	○	
16	Contents of malfunction (2 cycle before)	○	●	○	●	●	●	●	
20	Contents of retry (the latest)	○	●	○	●	○	●	●	
21	Contents of retry (1 cycle before)	○	●	○	●	○	●	○	
22	Contents of retry (2 cycle before)	○	●	○	●	○	○	●	

Setting item 0 Display contents of "Various settings"

Defrost select setting	Short	◐	●	●	●	○	●	●
	Medium	◐	●	●	●	◐	●	●
	Long	◐	●	●	●	●	●	●
Te setting	H	◐	●	●	●	●	○	●
	M	◐	●	●	●	●	◐	●
	L	◐	●	●	●	●	●	●
Tc setting	H	◐	●	●	●	●	●	○
	M	◐	●	●	●	●	●	◐
	L	◐	●	●	●	●	●	●

Push the SET button and match with the LEDs No. 1 - 15, push the RETURN button, and enter the data for each setting.

★ Data such as addresses and number of units is expressed as binary numbers; the two ways of expressing are as follows:



The No. 5 cool/heat unified address is expressed as a binary number consisting of the lower 6 digits. (0 - 63)

In ① the address is 000110 (binary number), which translates to $4 + 2 = 6$ (base 10 number). In other words, the address is 6.

3.3 Detail of Setting Mode

3.3.1 Cool / Heat Mode Switching

The Cool / Heat Mode switching is carried out by remote controller fitted to indoor unit.
This setting is not required for normal operation. (Factory set)

3.3.2 Setting of Low Noise Operation and Demand Operation

Setting of Low Noise Operation

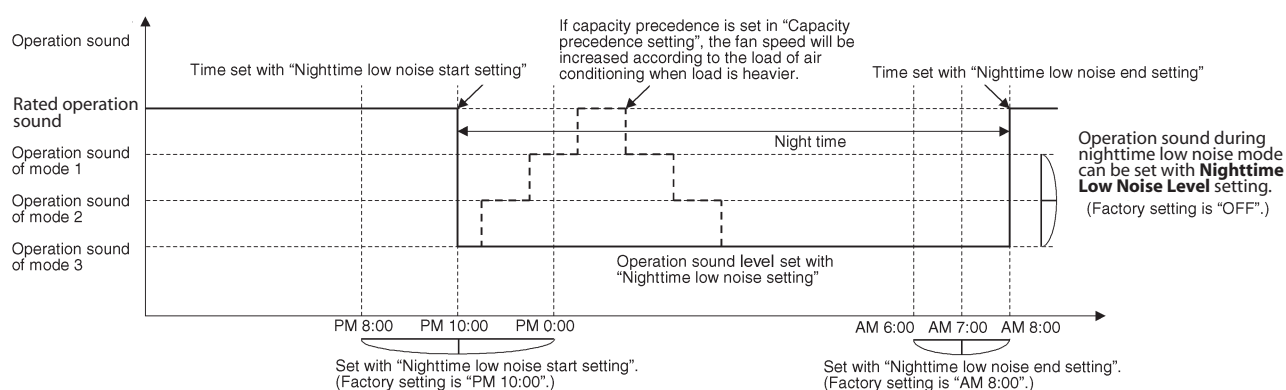
By setting the low noise operation input to the outdoor unit P.C.B., you can lower operating noise by 2-3 dB.

Setting	Content
Mode 1	Set the outdoor unit fan to Step 6 or lower.
Mode 2	Set the outdoor unit fan to Step 5 or lower.
Mode 3	Set the outdoor unit fan to Step 4 or lower.

The low noise operation is carried out automatically at night. (The external control adapter for the outdoor unit is not required.)

1. While in "Setting mode 2", select the setting condition (i.e., "Mode 1", "Mode 2", or "Mode 3") for set item No. 22 (Setting of nighttime low noise level).
2. If necessary, while in "Setting mode 2", select the setting condition (i.e., "PM 8:00", "PM 10:00", or "PM 0:00") for set item No. 26 (Setting of start time of nighttime low noise operation).
(Use the start time as a guide since it is estimated according to outdoor temperatures.)
3. If necessary, while in "Setting mode 2", select the setting condition (i.e., "AM 6:00", "AM 7:00", or "AM 8:00") for set item No. 27 (Setting of end time of nighttime low noise operation).
(Use the end time as a guide since it is estimated according to outdoor temperatures.)
4. If necessary, while in "Setting mode 2", set the setting condition for set item No. 29 (Setting of capacity precedence) to "ON".
(If the condition is set to "ON", when the air-conditioning load reaches a high level, the system will be put into normal operation mode even during nighttime.)

Image of operation



Setting of Demand Operation

By setting the demand input to the outdoor unit P.C.B., the power consumption of unit operation can be saved suppressing the compressor operating condition.

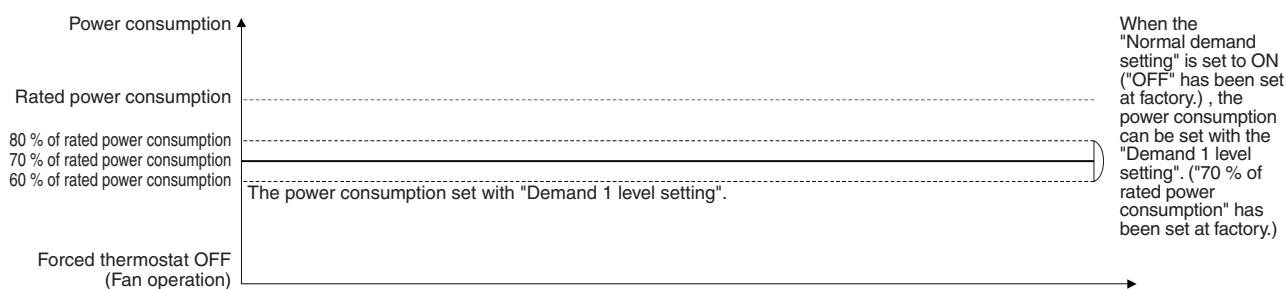
[Demand setting]

Setting	Standard for upper limit of power consumption
Demand setting 1	Approx. 60%
Demand setting 2 (factory setting)	Approx. 70%
Demand setting 3	Approx. 80%

The normal demand operation is carried out. (Use of the external control adapter for outdoor unit is not required.)

1. Set the "Normal demand setting" on the outdoor unit P.C.B.
2. If the "Normal demand setting" is set to the "ON", set the "Demand 1 setting" on the outdoor unit P.C.B., as the need arises.
(During the normal demand level 1 operation, the power consumption can be saved to 80 %, 70 % or 60 % of the rated value respectively.)

Image of operation



Detailed Setting Procedure of Low Noise Operation and Demand Control

1. Setting mode 1 (H1P off)

- ① In setting mode 2, push the **BS1 (MODE)** button one time. → Setting mode 1 is entered and H1P off.
During the setting mode 1 is displayed, "In low noise operation" and "In demand control" are displayed.

2. Setting mode 2 (H1P on)

- ① In setting 1, push and hold the **BS1 (MODE)** button for more than 5 seconds. → Setting mode 2 is entered and H1P lights.
- ② Push the **BS2 (SET)** button several times and match the LED display with the Setting No. you want.
- ③ Push the **BS3 (RETURN)** button one time, and the present setting content is displayed.
→ Push the **BS2 (SET)** button several times and match the LED display with the setting content (as shown on next page) you want.
- ④ Push the **BS3 (RETURN)** button two times. → Returns to ①.
- ⑤ Push the **BS1 (MODE)** button one time. → Returns to the setting mode 1 and turns H1P off.

○: ON ●: OFF ◐: Blink

①									②							③								
Setting No.	Setting contents	Setting No. indication							Setting No. indication							Setting contents	Setting contents indication (Initial setting)							
		H1P	H2P	H3P	H4P	H5P	H6P	H7P	H1P	H2P	H3P	H4P	H5P	H6P	H7P		H1P	H2P	H3P	H4P	H5P	H6P	H7P	
12	External low noise / Demand setting	○	●	●	●	●	●	●	○	●	●	○	○	●	●	NO (Factory set)	○	●	●	●	●	●	○	
22	Night-time low noise setting								○	●	○	●	○	○	●	OFF (Factory setting)	○	●	●	●	●	●	○	●
									Mode 1	○	●	●	●	●	●	○	●							
									Mode 2	○	●	●	●	●	●	○	●							
									Mode 3	○	●	●	●	●	●	○	●							
26	Night-time low noise start setting								○	●	○	○	●	○	●	PM 8:00	○	●	●	●	○	●	○	●
									PM 10:00 (Factory setting)	○	●	●	●	○	○	●								
									PM 0:00	○	●	●	●	○	●	●								
27	Night-time low noise end setting								○	●	○	○	●	○	○	AM 6:00	○	●	●	●	○	●	○	●
									AM 7:00	○	●	●	●	○	○	●								
									AM 8:00 (Factory setting)	○	●	●	●	○	○	●								
29	Capacity precedence setting								○	●	○	○	○	●	○	Low noise precedence (Factory setting)	○	●	●	●	○	●	○	●
		Capacity precedence	○	●	●	●	○	○	●															
30	Demand setting 1	○	●	○	○	○	○	●	60 % of rated power consumption	○	●	●	●	○	●	○	●							
		70 % of rated power consumption (Factory setting)	○	●	●	●	○	○	●															
		80 % of rated power consumption	○	●	●	●	○	○	●															
32	Normal demand setting	○	○	●	●	●	●	●	OFF (Factory setting)	○	●	●	●	○	●	○	●							
		ON	○	●	●	●	○	○	●															
		Setting mode indication section							Setting No. indication section							Set contents indication section								

Setting mode indication section

Setting No. indication section

Set contents indication section

3.3.3 Setting of Refrigerant Recovery Mode

When carrying out the refrigerant collection on site, fully open the respective expansion valves of indoor and outdoor units

Both the outdoor unit and the indoor unit cannot be operated at this time.

[Operation procedure]

- ① In **setting mode 2** with units in stop mode, set **Refrigerant Recovery / Vacuuming mode** to ON. The respective expansion valve of indoor and outdoor units are fully opened. (H2P turns to display **TEST OPERATION** (blinks), **TEST OPERATION** and **UNDER CENTRALIZED CONTROL** are displayed on the remote controller, and the operation is prohibited.
- ② Collect the refrigerant using a refrigerant recovery unit. (See the instruction attached to the refrigerant recovery unit for more detail.)
- ③ Press Mode button **BS1** once and reset **Setting Mode 2**.

3.3.4 Setting of Vacuuming Mode

In order to perform vacuuming operation at site, fully open the expansion valves of indoor and outdoor units to turn on some solenoid valves.

Both the outdoor unit and the indoor unit cannot be operated at this time.

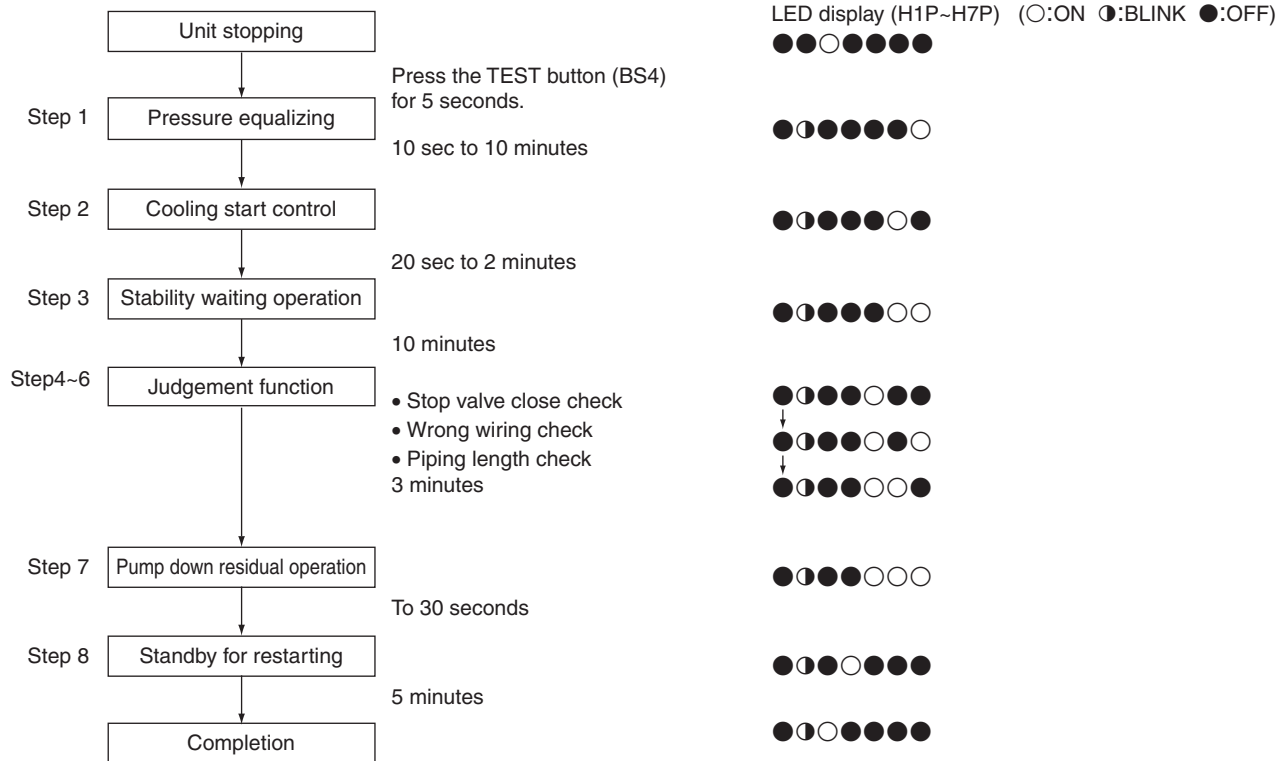
[Operating procedure]

- ① With **Setting Mode 2** while the unit stops, set **Refrigerant recovery / Vacuuming mode** to ON. The expansion valves of indoor and outdoor units fully open and some of solenoid valves open.
(H2P blinks to indicate the test operation, and the remote controller displays **TEST OPERATION** and **UNDER CENTRALIZED CONTROL**, thus prohibiting operation.)
After setting, do not cancel **Setting Mode 2** until completion of Vacuuming operation.
- ② Use the vacuum pump to perform vacuuming operation.
- ③ Press Mode button **BS1** once and reset **Setting Mode 2**.

3.3.5 Check Operation

To prevent any trouble in the period of installation at site, the system is provided with a test operation mode enabling checks for incorrect wiring, stop valve left closed, and automatic determination of piping length.

CHECK OPERATION FUNCTION



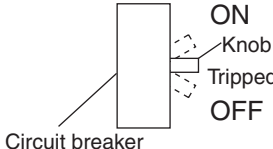
Part 7

Troubleshooting

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1. Symptom-based Troubleshooting

	Symptom	Supposed Cause	Countermeasure
1	The system does not start operation at all.	Blowout of fuse(s)	Turn Off the power supply and then replace the fuse(s).
		Cutout of breaker(s)	- If the knob of any breaker is in its OFF position, turn ON the power supply. - If the knob of any circuit breaker is in its tripped position, do not turn ON the power supply. 
		Power failure	After the power failure is reset, restart the system.
2	The system starts operation but makes an immediate stop.	Blocked air inlet or outlet of indoor or outdoor unit	Remove obstacle(s).
		Clogged air filter(s)	Clean the air filter(s).
3	The system does not cool or heat air well.	Blocked air inlet or outlet of indoor or outdoor unit	Remove obstacle(s).
		Clogged air filter(s)	Clean the air filter(s).
		Enclosed outdoor unit(s)	Remove the enclosure.
		Improper set temperature	Set the temperature to a proper degree.
		Airflow rate set to "LOW"	Set it to a proper airflow rate.
		Improper direction of air diffusion	Set it to a proper direction.
		Open window(s) or door(s)	Shut it tightly.
		[In cooling] Direct sunlight received	Hang curtains or shades on windows.
		[In cooling] Too many persons staying in a room	
		[In cooling] Too many heat sources (e.g. OA equipment) located in a room	
4	The system does not operate.	The system stops and immediately restarts operation.	Normal operation. The system will automatically start operation after a lapse of five minutes.
		Pressing the TEMP ADJUST button immediately resets the system.	
		The remote controller displays "UNDER CENTRALIZED CONTROL", which blinks for a period of several seconds when the OPERATION button is depressed.	Operate the system using the COOL/HEAT centralized remote controller.
		The system stops immediately after turning ON the power supply.	Wait for a period of approximately one minute.
5	The system makes intermittent stops.	The remote controller displays malfunction codes "U4" and "U5", and the system stops but restarts after a lapse of several minutes.	The system stops due to an interruption in communication between units caused by electrical noises coming from equipment other than air conditioners.
			Remove causes of electrical noises. If these causes are removed, the system will automatically restart operation.

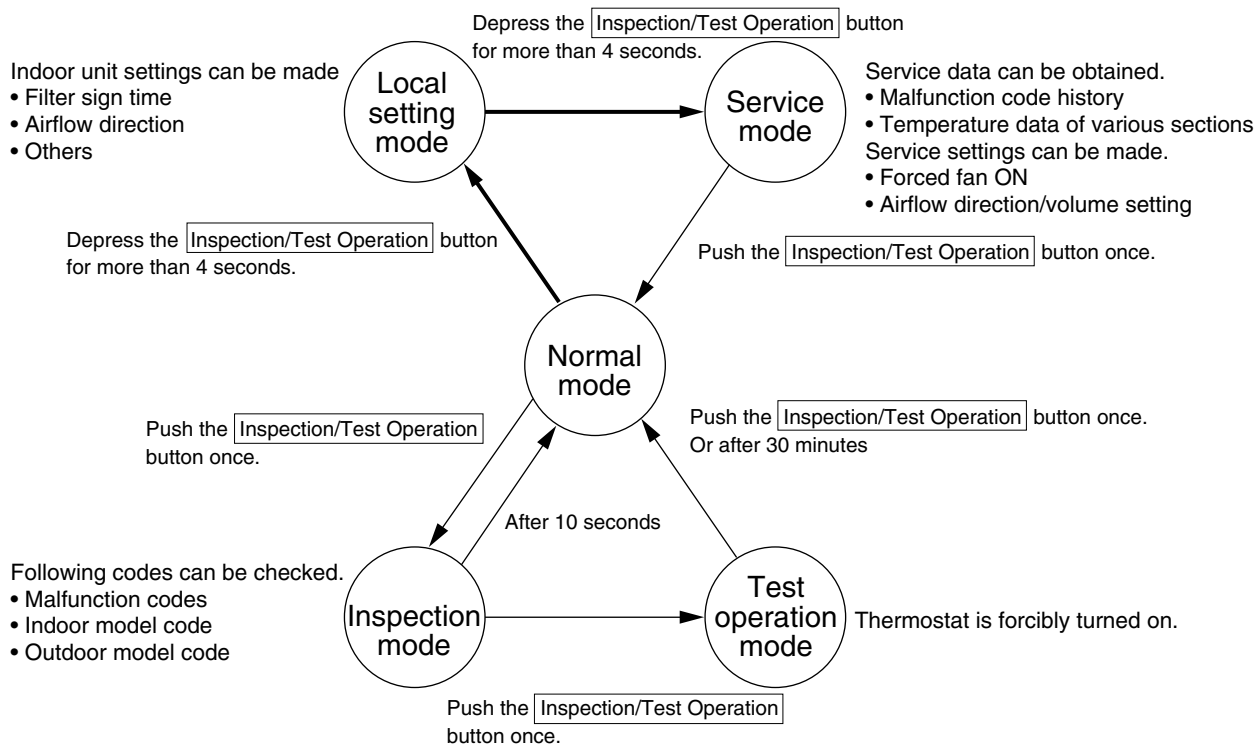
	Symptom		Supposed Cause	Countermeasure
6	COOL-HEAT selection is disabled.	The remote controller displays "UNDER CENTRALIZED CONTROL".	This remote controller has no option to select cooling operation.	Use a remote controller with option to select cooling operation.
		The remote controller displays "UNDER CENTRALIZED CONTROL", and the COOL-HEAT selection remote controller is provided.	COOL-HEAT selection is made using the COOL-HEAT selection remote controller.	Use the COOL-HEAT selection remote controller to select cool or heat.
7	The system conducts fan operation but not cooling or heating operation.	This symptom occurs immediately after turning ON the power supply.	The system is in preparation mode of operation.	Wait for a period of approximately 10 minutes.
8	The airflow rate is not reproduced according to the setting.	Even pressing the AIRFLOW RATE SET button makes no changes in the airflow rate.	In heating operation, when the room temperature reaches the set degree, the outdoor unit will stop while the indoor unit is brought to fan LL operation so that no one gets cold air. Furthermore, if fan operation mode is selected when other indoor unit is in heating operation, the system will be brought to fan LL operation. (The fan LL operation is also enabled while in oil return mode in cooling operation.)	Normal operation.
9	The airflow direction is not reproduced according to the setting.	The airflow direction is not corresponding to that displayed on the remote controller. The fin does not swing.	Automatic control	Normal operation.
10	A white mist comes out from the system.	<Indoor unit> In cooling operation, the ambient humidity is high. (This indoor unit is installed in a place with a lot of oil or dust.)	Uneven temperature distribution due to heavy stain of the inside of the indoor unit	Clean the inside of the indoor unit.
		<Indoor unit> Immediately after cooling operation stopping, the ambient temperature and humidity are low.	Hot gas (refrigerant) flowing in the indoor unit becomes vapor from the unit.	Normal operation.
		<Indoor and outdoor units> After the completion of defrosting operation, the system is switched to heating operation.	Defrosted moisture turns to vapor emitting from the units.	Normal operation.

	Symptom	Supposed Cause	Countermeasure
11	The system produces sounds.	<Indoor unit> Immediately after turning ON the power supply, indoor unit produces "ringing" sounds.	These are operating sounds of the electronic expansion valve of the indoor unit.
		<Indoor and outdoor units> "Hissing" sounds are continuously produced while in cooling or defrosting operation.	Normal operation.
		<Indoor and outdoor units> "Hissing" sounds are produced immediately after the startup or stop of the system, or the startup or stop of defrosting operation.	Normal operation.
		<Indoor unit> Faint sounds are continuously produced while in cooling operation or after stopping the operation.	Normal operation.
		<Indoor unit> "Creaking" sounds are produced while in heating operation or after stopping the operation.	Normal operation.
		<Indoor unit> Sounds like "trickling" or the like are produced from indoor units in the stopped state.	On VRV systems, these sounds are produced when other indoor units in operation. The reason is that the system runs in order to prevent oil or refrigerant from dwelling.
		<Outdoor unit> Pitch of operating sounds changes.	The reason is that the compressor changes the operating frequency.
12	Dust emits from the system.	Dust emits from the system when it restarts after the stop for an extended period of time.	Dust, which has deposited on the inside of indoor unit, is blown out from the system.
13	Odors emits from the system.	In operation	Odors of room, such as cigarette smoke, are absorbed to the inside of indoor unit and are then blown out.
14	Outdoor unit fan does not rotate.	In operation	The reason is that fan revolutions are controlled to put the operation to the optimum state.
15	LCD display "88" appears on the remote controller.	Immediately after turning ON the power supply	The reason is that the system is checking to be sure the remote controller is normal.
16	The outdoor unit compressor or the outdoor unit fan does not stop.	After stopping operation	It stops in order to prevent oil or refrigerant from dwelling.
17	The outdoor gets hot.	While stopping operation	The reason is that the compressor is warmed up to provide smooth startup of the system.
18	Hot air comes out from the system even though it stops.	Hot air is felt while the system stops.	On VRV systems, small quantity of refrigerant is fed to indoor units in the stopped state when other indoor units are in operation.
19	The system does not cool air well.	The system is in dry operation.	The reason is that the dry operation serves not to reduce the room temperature where possible.

2. Troubleshooting by Remote Controller

2.1 The INSPECTION / TEST Button

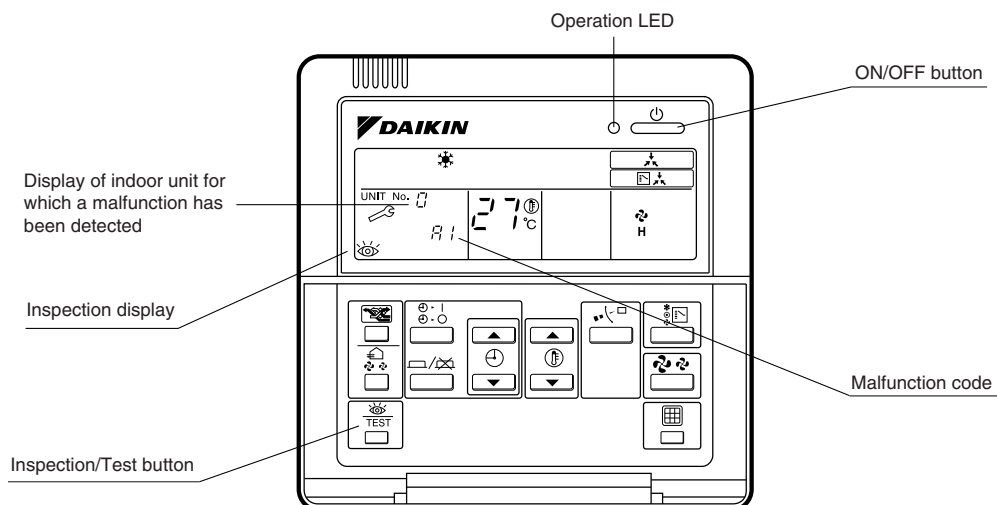
The following modes can be selected by using the [Inspection/Test Operation] button on the remote control.



2.2 Self-diagnosis by Wired Remote Controller

Explanation

If operation stops due to malfunction, the remote controller's operation LED blinks, and the malfunction code is displayed. (Even if stop operation is carried out, malfunction contents are displayed when the inspection mode is entered.) The malfunction code enables you to tell what kind of malfunction caused operation to stop. Refer to P.79 for malfunction code and malfunction contents.



Note:

1. Pressing the **INSPECTION/TEST** button will blink the check indication.
2. While in check mode, pressing and holding the ON/OFF button for a period of five seconds or more will clear the failure history indication shown above. In this case, on the codes displayed, the malfunction code will blink twice and then change to "00" (=Normal), the Unit No. will change to "0", and the operation mode will automatically switch from check mode to normal mode (displaying the set temperature).

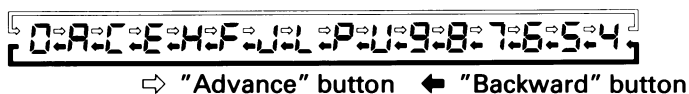
2.3 Self-diagnosis by Wireless Remote Controller

In the Case of BRC7C Type BRC7E Type BRC4C Type

If equipment stops due to a malfunction, the operation indicating LED on the light reception section flashes.

The malfunction code can be determined by following the procedure described below. The malfunction code is displayed when an operation error has occurred. In normal condition, the malfunction code of the last problem is displayed.

1. Push the INSPECTION/TEST button to select "Inspection."
The equipment enters the inspection mode. The "Unit" indication lights and the Unit No. display shows flashing "0" indication.
 2. Set the Unit No.
Push the UP or DOWN button and change the Unit No. display until the buzzer (*1) is generated from the indoor unit.
*1 Number of beeps
3 short beeps : Conduct all of the following operations.
1 short beep : Conduct steps 3 and 4.
Continue the operation in step 4 until a buzzer remains ON. The continuous buzzer indicates that the malfunction code is confirmed.
Continuous beep : No abnormality.
 3. Push the MODE selector button.
The left "0" (upper digit) indication of the malfunction code flashes.
 4. Malfunction code upper digit diagnosis
Push the UP or DOWN button and change the malfunction code upper digit until the malfunction code matching buzzer (*2) is generated.
- The upper digit of the code changes as shown below when the UP and DOWN buttons are pushed.



*2 Number of beeps

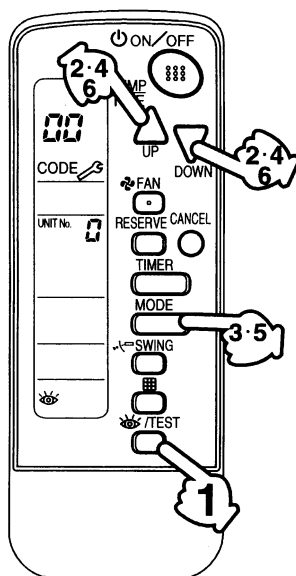
Continuous beep : Both upper and lower digits matched. (Malfunction code confirmed)

2 short beeps : Upper digit matched.

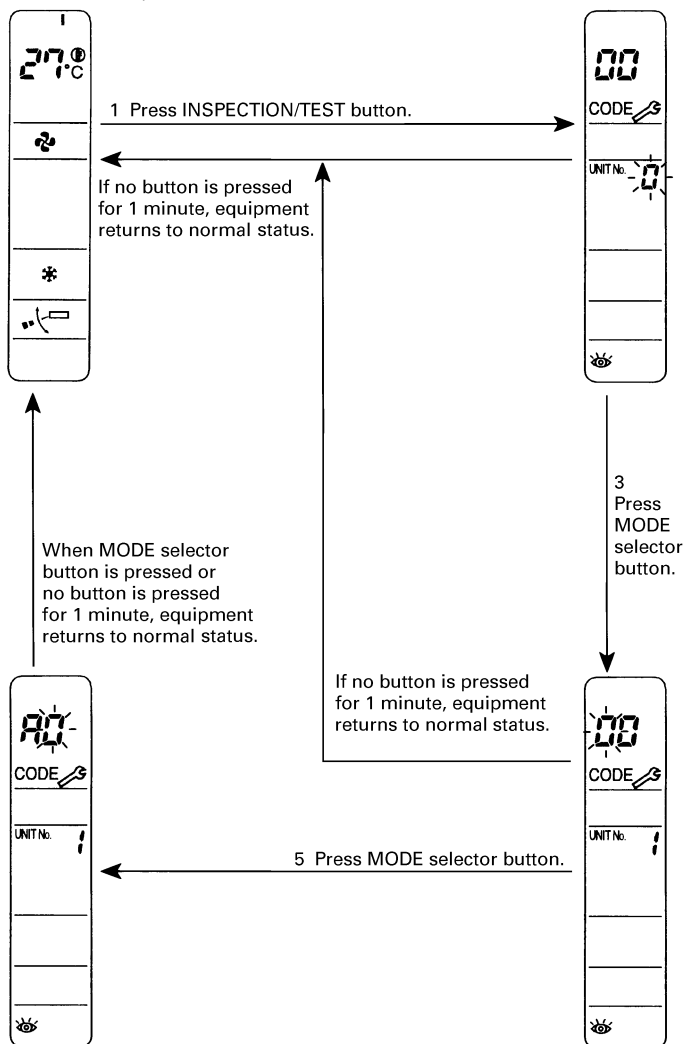
1 short beep : Lower digit matched.

5. Push the MODE selector button.
The right "0" (lower digit) indication of the malfunction code flashes.
6. Malfunction code lower digit diagnosis
Push the UP or DOWN button and change the malfunction code lower digit until the continuous malfunction code matching buzzer (*2) is generated.

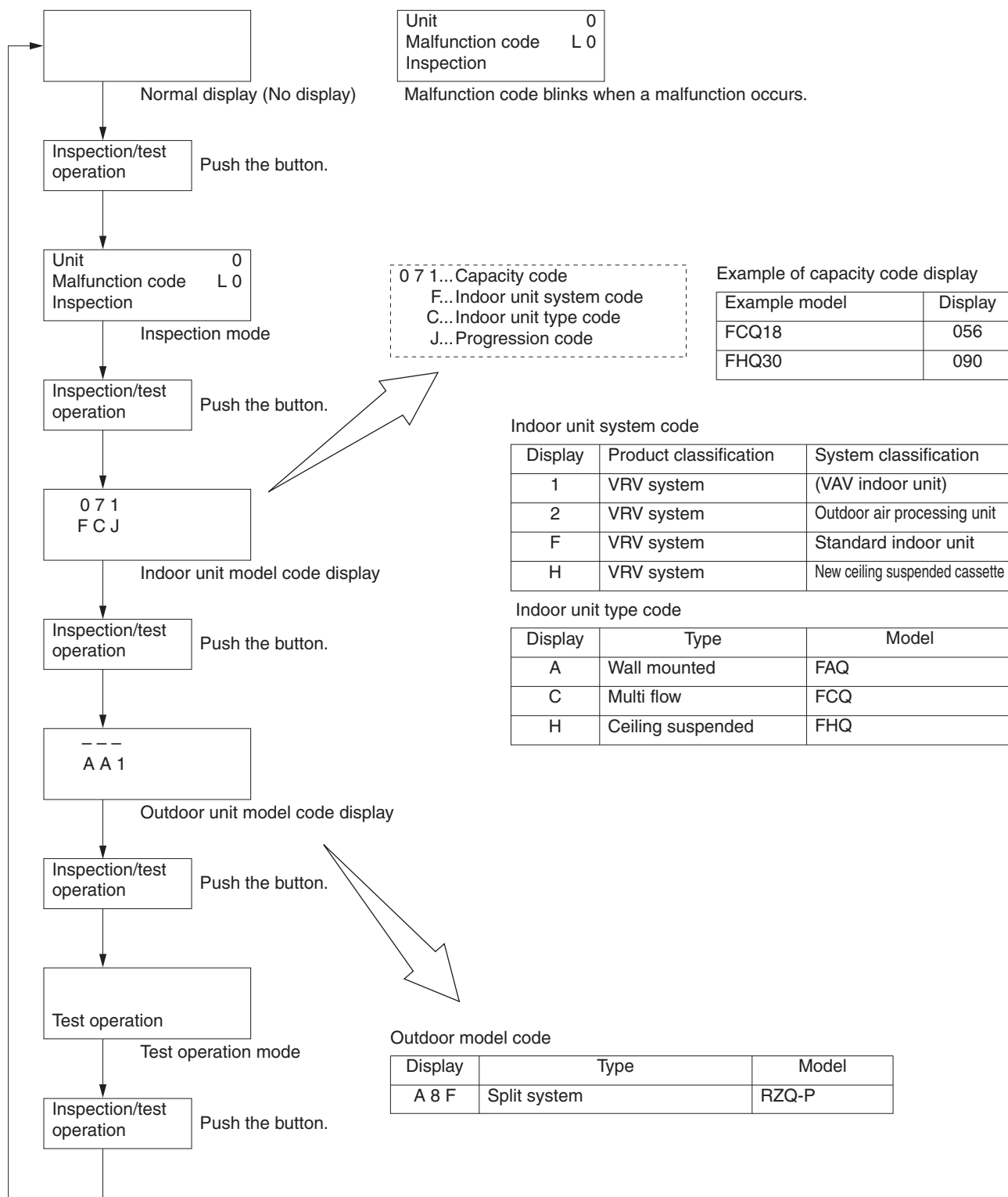
- The lower digit of the code changes as shown below when the UP and DOWN buttons are pressed.



Normal status
 Enters inspection mode from
 normal status when the INSPECTION/
 TEST button is pressed.

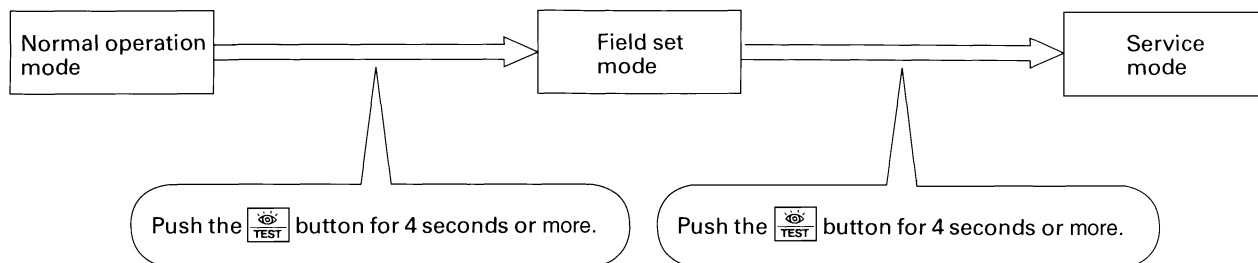


2.4 Operation of the Remote Controller's Inspection / Test Operation Button



2.5 Remote Controller Service Mode

How to Enter the Service Mode



Service Mode Operation Method

1. Select the mode No.

Set the desired mode No. with the  button.
(For wireless remote controller, Mode 43 only can be set.)

2. Select the unit No. (For group control only)

Select the indoor unit No. to be set with the time mode . (For wireless remote controller,  button.)

3. Make the settings required for each mode. (Modes 41, 44, 45)

In case of Mode 44, 45, push the  button to be able to change setting before setting work.
(LCD “code” blinks.)

For details, refer to the table in next page.

4. Define the setting contents. (Modes 44, 45)

Define by pushing the timer  button.
After defining, LCD “code” changes blinking to ON.

5. Return to the normal operation mode.

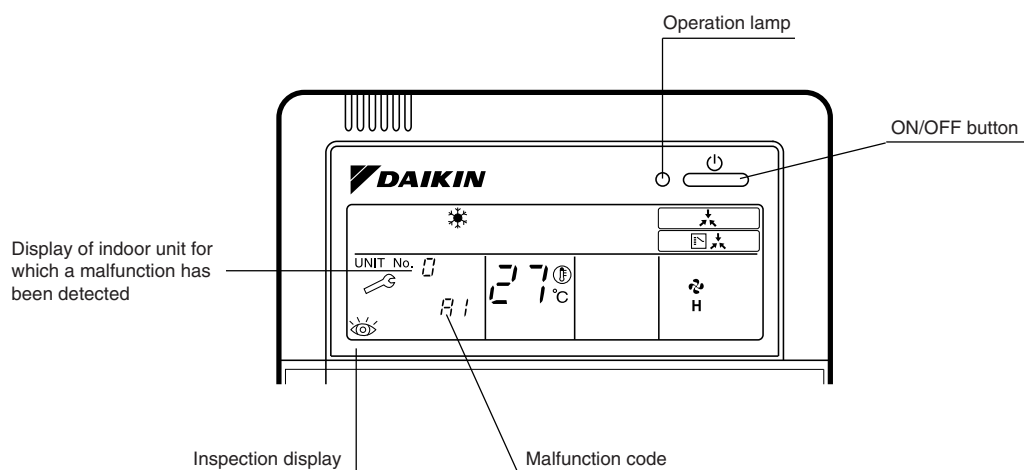
Push the  button one time.

Mode No	Function	Contents and operation method	Remote controller display example
40	Malfunction hysteresis display	Display malfunction history. The history No. can be changed with the  button.	Unit 1 Malfunction code 40 2-U4 Malfunction code History No: 1 - 9 1: Latest
41	Display of sensor and address data	Display various types of data. Select the data to be displayed with the  button. Sensor data 0: Thermostat sensor in remote controller. 1: Suction 2: Liquid pipe 3: Gas pipe Address data 4: Indoor unit address 5: Outdoor unit address 6: BS unit address 7: Zone control address 8: Cool/heat group address 9: Demand / low noise address	Sensor data display Unit No. Sensor type 1 1 41 2 7 Temperature °C Address display Unit No. Address type 1 8 41 1 Address
43	Forced fan ON	Manually turn the fan ON by each unit. (When you want to search for the unit No.) By selecting the unit No. with the  button, you can turn the fan of each indoor unit on (forced ON) individually.	Unit 1 43
44	Individual setting	Set the fan speed and airflow direction by each unit Select the unit No. with the time mode  button. Set the fan speed with the  button. Set the airflow direction with the  button.	Unit 1 Code 44 1 3 Fan speed 1: Low 3: High Airflow direction P0 - P4
45	Unit No. transfer	Transfer unit No. Select the unit No. with the  button. Set the unit No. after transfer with the  button.	Present unit No. Unit 1 Code 45 0 2 Unit No. after transfer

2.6 Remote Controller Self-Diagnosis Function

The remote controller switches are equipped with a self-diagnosis function so that more appropriate maintenance can be carried out. If a malfunction occurs during operation, the operation lamp, malfunction code and display of malfunctioning unit No. let you know the contents and location of the malfunction.

When there is a stop due to malfunction, the contents of the malfunction given below can be diagnosed by a combination of operation lamp, INSPECTION display of the liquid crystal display, and display of malfunction code. It also lets you know the unit No. during group control.



○: ON ●: OFF ◐: Blink

	Malfunction code	Operation lamp	Inspection display	Unit No.	Malfunction contents	Page Referred
Indoor Unit	A0	◐	◐	◐	Error of external protection device	85
	A1	◐	◐	◐	P.C.B. defect, E ² PROM defect	86
	A3	◐	◐	◐	Malfunction of drain level control system (S1L)	87
	A6	◐	◐	◐	Fan motor (M1F) lock, overload	89
	A7	○	◐	◐	Malfunction of louver motor (M1S)	90
	A9	◐	◐	◐	Malfunction of moving part of electronic expansion valve (Y1E)	92
	AF	○	●	◐	Drain level above limit	94
	AJ	◐	◐	◐	Malfunction of capacity determination device	95
	C4	◐	◐	◐	Malfunction of thermistor (R2T) for heat exchanger (loose connection, disconnection, short circuit, failure)	96
	C5	◐	◐	◐	Malfunction of thermistor (R3T) for gas pipes (loose connection, disconnection, short circuit, failure)	97
	C9	◐	◐	◐	Malfunction of thermistor (R1T) for suction air (loose connection, disconnection, short circuit, failure)	98
	CA	◐	◐	◐	Malfunction of thermistor for discharge air (loose connection, disconnection, short circuit, failure)	99
	CJ	○	◐	○	Malfunction of thermostat sensor in remote controller	100
Outdoor Unit	E1	◐	◐	◐	P.C.B. defect	101
	E3	◐	◐	◐	Actuation of high pressure switch	102
	E4	◐	◐	◐	Actuation of low pressure sensor	104
	E5	◐	◐	◐	Inverter compressor motor lock	106
	E6	◐	◐	◐	Standard compressor lock or overcurrent	—
	E7	◐	◐	◐	Malfunction of outdoor unit fan motor	108
	E9	◐	◐	◐	Malfunction of moving part of electronic expansion valve (Y1E)	109
	F3	◐	◐	◐	Abnormal discharge pipe temperature	111
	F6	◐	◐	◐	Refrigerant overcharged	112
	H3	○	●	◐	Failure of high pressure switch	—
	H4	◐	◐	◐	Actuation of low pressure switch	—
	H7	◐	◐	◐	Abnormal outdoor fan motor signal	—
	H9	◐	◐	◐	Malfunction of thermistor (R1T) for outdoor air (loose connection, disconnection, short circuit, failure)	113
	J2	◐	◐	◐	Current sensor malfunction	—
	J3	◐	◐	◐	Malfunction of discharge pipe thermistor (R2T) (loose connection, disconnection, short circuit, failure)	114
	J5	◐	◐	◐	Malfunction of thermistor (R3T, R5T) for suction pipe 1,2 (loose connection, disconnection, short circuit, failure)	115
	J6	◐	◐	◐	Malfunction of thermistor (R4T) for outdoor unit heat exchanger (loose connection, disconnection, short circuit, failure)	116
	JA	◐	◐	◐	Malfunction of high pressure sensor	117
	JC	◐	◐	◐	Malfunction of low pressure sensor	119
	L0	◐	◐	◐	Inverter system error	—
	L1	◐	◐	◐	Malfunction of P.C.B.	121
	L4	◐	◐	◐	Malfunction of inverter radiating fin temperature rise	122
	L5	◐	◐	◐	Inverter compressor abnormal	123
	L8	◐	◐	◐	Inverter current abnormal	124
	L9	◐	◐	◐	Inverter start up error	126

○: ON ●: OFF ◐: Blink

	Malfunction code	Operation lamp	Inspection display	Unit No.	Malfunction contents	Page Referred
Outdoor Unit	LA	◐	◐	◐	Malfunction of power unit	—
	LC	◐	◐	◐	Malfunction of transmission between inverter and control P.C.B.	127
	P4	○	◐	○	Malfunction of inverter radiating fin temperature rise sensor	128
System	U0	○	●	◐	Low pressure drop due to refrigerant shortage or electronic expansion valve failure	129
	U1	◐	◐	◐	Reverse phase / open phase	—
	U2	◐	◐	◐	Power supply insufficient or instantaneous failure	131
	U3	◐	◐	◐	Check operation not executed	133
	U4	◐	◐	◐	Malfunction of transmission between indoor units and outdoor units	134
	U5	◐	◐	◐	Malfunction of transmission between remote controller and indoor unit	136
	U5	●	○	●	Failure of remote controller P.C.B. or setting during control by remote controller	136
	U7	◐	◐	◐	Malfunction of transmission between outdoor units	—
	U8	◐	◐	●	Malfunction of transmission between main and sub remote controllers (malfunction of sub remote controller)	137
	UE	◐	◐	◐	Malfunction of transmission between centralized remote controller and indoor unit	138
	UF	◐	◐	◐	System is not set	140
	UH	◐	◐	◐	Malfunction of system, refrigerant system address undefined	141
Centralized Remote Controller and Schedule Timer	UE	◐	◐	◐	Malfunction of transmission between centralized remote controller and indoor unit	143
	M1	○ or ●	◐	◐	P.C.B. defect	145
	M8	○ or ●	◐	◐	Malfunction of transmission between optional controllers for centralized control	146
	MA	○ or ●	◐	◐	Improper combination of optional controllers for centralized control	147
	MC	○ or ●	◐	◐	Address duplication, improper setting	149
Heat Reclaim Ventilation	64	○	●	◐	Indoor unit's air thermistor error	—
	65	○	●	◐	Outside air thermistor error	—
	68	○	●	◐	Malfunction of HVU	—
	6A	○	●	◐	Damper system alarm	—
	6A	◐	◐	◐	Damper system + thermistor error	—
	6F	○	●	◐	Malfunction of simple remote controller	—
	94	◐	◐	◐	Internal transmission error	—

 The system operates for malfunction codes indicated in gray squares, however, be sure to check and repair.

Malfunction code indication by outdoor unit P.C.B.

<Monitor mode>

To enter the monitor mode, push the **MODE (BS1)** button when in "Setting mode 1".

<Selection of setting item>

Push the **SET (BS2)** button and set the LED display to a setting item.

<Confirmation of malfunction 1>

Push the **RETURN (BS3)** button once to display "First digit" of malfunction code.

<Confirmation of malfunction 2>

Push the **SET (BS2)** button once to display "Second digit" of malfunction code.

<Confirmation of malfunction 3>

Push the **SET (BS2)** button once to display "malfunction location".

<Confirmation of malfunction 4>

Push the **SET (BS2)** button once to display "master or slave 1 or slave 2" and "malfunction location".

Push the **RETURN (BS3)** button and switches to the initial status of "Monitor mode".

* Push the **MODE (BS1)** button and returns to "Setting mode 1".

Detail description on next page.

Contents of malfunction		Malfunction code
In-phase malfunction of DIII-Net	Detection of DIII-Net	E1
Abnormal discharge pressure	HPS activated	E3
Abnormal suction pressure	Abnormal Pe	E4
Compressor lock	Detection of INV. compressor lock	E5
Over load, overcurrent,	Detection of DC fan 1 motor lock	E7
Malfunction of electronic expansion	EV1	E9
Faulty sensor of outdoor air temperature	Faulty Ta sensor (short)	H9
Abnormal discharge pipe temperature	Abnormal Td	F3
Abnormal heat exchanger temperature	Refrigerant over charge	F6
Faulty sensor of discharge pipe temperature	Faulty Tdi sensor (short)	J3
Faulty sensor of suction pipe temperature	Faulty Ts1 sensor (short)	J5
	Faulty Ts2 sensor (short)	
Faulty sensor of heat exchanger temperature	Faulty Tb sensor (short)	J6
Faulty sensor of discharge pressure	Faulty Pc sensor (short)	JA
Faulty sensor of suction pressure	Faulty Pe sensor (short)	JC
Faulty Inverter P.C.B.	Faulty IPM	L1
	Abnormal Current sensor offset	
	Abnormal IGBT	
	Faulty Current sensor	
	Abnormal SP-PAM over-voltage	
Inverter radiation fin temperature rising	Over heating of inverter radiation fin temperature	L4
DC output overcurrent	Inverter instantaneous overcurrent	L5
Electronic thermal	Electronic thermal switch 1	L8
	Electronic thermal switch 2	
	Out-of-step	
	Speed down after startup	
	Lightening detection	
Stall prevention (Limit time)	Stall prevention (Current increasing)	L9
	Stall prevention (Faulty start up)	
	Abnormal wave form in startup	
	Out-of-step	
Transmission error between inverter and outdoor unit	Inverter transmission error	LC

○: ON ●: OFF ◐: Blink

Malfunction code	Confirmation of malfunction 1							Confirmation of malfunction 2							Confirmation of malfunction 3							Confirmation of malfunction 4						
	H1P	H2P	H3P	H4P	H5P	H6P	H7P	H1P	H2P	H3P	H4P	H5P	H6P	H7P	H1P	H2P	H3P	H4P	H5P	H6P	H7P	H1P	H2P	H3P	H4P	H5P	H6P	H7P
E1	◐			●	●	◐	◐	◐			●	●	●	◐	◐	○	●	●	●	●	◐	○	○	●	●	◐	◐	
E3				●	●	◐	◐	◐			●	●	◐	◐	◐			●	●	●	●	◐			●	●		*1
E4				●	●	◐	◐	◐			●	◐	●	●	◐			●	●	●	●	◐			●	●		
E5				●	●	◐	◐	◐			●	◐	●	◐	◐			●	●	●	●	◐			●	●		
E7				●	●	◐	◐	◐			●	◐	◐	◐	◐			●	●	●	●	◐			●	◐		
E9				●	●	◐	◐	◐			◐	●	●	◐	◐			●	●	●	●	◐			●	●		
H9				●	●	◐	◐	◐			◐	●	●	◐	◐			●	●	●	●	◐			●	●		*1
F3	◐			●	◐	●	◐	◐			●	●	◐	◐	◐			●	●	●	●	◐			●	●		*1
F6				●	●	◐	◐	◐			●	◐	◐	●	◐			●	●	●	●	◐			●	●	◐	◐
J3	◐			●	◐	◐	●	◐			●	●	◐	◐	◐			●	●	●	●	◐			●	●		*1
J5				●	●	◐	◐	◐			●	◐	●	◐	◐			●	●	●	●	◐			●	●		
J6				●	●	◐	◐	◐			●	◐	◐	●	◐			●	●	●	●	◐			●	●		
JA				●	●	◐	◐	◐			◐	●	◐	●	◐			●	●	●	●	◐			●	●		
JC				●	●	◐	◐	◐			◐	◐	●	●	◐			●	●	●	●	◐			●	●		
L1	◐			●	◐	◐	◐	◐			●	●	●	◐	◐			●	●	●	●	◐			●	●	●	●
				●	●	◐	◐	◐			●	●	●	◐	◐			●	●	●	●	◐			●	●	●	◐
				●	●	◐	◐	◐			●	●	●	◐	◐			●	●	●	●	◐			●	●	●	◐
				●	●	◐	◐	◐			●	●	●	◐	◐			●	●	●	●	◐			●	●	●	◐
				●	●	◐	◐	◐			●	●	●	◐	◐			●	●	●	●	◐			●	◐	●	●
L4				●	●	◐	◐	◐			●	◐	●	●	◐			●	●	●	●	◐			●	●		*1
L5				●	●	◐	◐	◐			●	◐	●	◐	◐			●	●	●	●	◐			●	●		
L8				●	●	◐	◐	◐			◐	●	●	●	◐			●	●	●	●	◐			●	●		
				●	●	◐	◐	◐							◐			●	●	●	●	◐			●	◐		
				●	●	◐	◐	◐							◐			●	●	●	●	◐			●	●		
				●	●	◐	◐	◐							◐			●	●	●	●	◐			●	●		
L9				●	●	◐	◐	◐			◐	●	●	◐	◐			●	●	●	●	◐			●	●		*1
				●	●	◐	◐	◐							◐			●	●	●	●	◐			●	◐		
				●	●	◐	◐	◐							◐			●	●	●	●	◐			●	●		
LC				●	●	◐	◐	◐			◐	◐	●	●	◐			●	●	●	●	◐			●	◐		

Display of contents of malfunction (first digit)

Display of contents of malfunction (second digit)

Display 1 of malfunction in detail

Display 2 of malfunction in detail

※1

●	●	Master
●	◐	Slave1
◐	●	Slave2
◐	◐	System

<Monitor mode>

To enter the monitor mode, push the **MODE (BS1)** button when in "Setting mode 1".

<Selection of setting item>

Push the **SET (BS2)** button and set the LED display to a setting item.

<Confirmation of malfunction 1>

Push the **RETURN (BS3)** button once to display "First digit" of malfunction code.

<Confirmation of malfunction 2>

Push the **SET (BS2)** button once to display "Second digit" of malfunction code.

<Confirmation of malfunction 3>

Push the **SET (BS2)** button once to display "malfunction location".

<Confirmation of malfunction 4>

Push the **SET (BS2)** button once to display "master or slave 1 or slave 2" and "malfunction location".

Push the **RETURN (BS3)** button and switches to the initial status of "Monitor mode".

* Push the **MODE (BS1)** button and returns to "Setting mode 1".

Contents of malfunction		Malfunction code
Faulty temperature sensor of inverter radiation fin	Faulty thermistor of inverter fin	P4
Refrigerant shortage	Refrigerant shortage alarm	U0
Abnormal power supply voltage	Insufficient Inverter voltage	U2
	Faulty charge of capacitor in main inverter circuit	
	Malfunction due to SP-PAM overvoltage	
	Malfunction due to P-N short circuit	
No implementation of test-run		U3
Transmission error between indoor and outdoor unit	I/O transmission error	U4
	I/O transmission error	
Faulty system malfunction	Wiring error (Auto-address error)	UH
Conflict in wiring and piping, no setting for system	Conflict in wiring and piping	UF

Detail description on next page.

○: ON ●: OFF ◐: Blink

Malfunction code	Confirmation of malfunction 1							Confirmation of malfunction 2							Confirmation of malfunction 3							Confirmation of malfunction 4						
	H1P	H2P	H3P	H4P	H5P	H6P	H7P	H1P	H2P	H3P	H4P	H5P	H6P	H7P	H1P	H2P	H3P	H4P	H5P	H6P	H7P	H1P	H2P	H3P	H4P	H5P	H6P	H7P
P4	◐			◐	●	●	●	◐			●	◐	●	●	◐			●	●	●	●	◐			●	●	*1	
U0	◐			◐	●	●	◐	◐			●	●	●	●	◐			●	●	●	●	◐			●	●	◐	◐
U2								◐			●	●	◐	●	◐			●	●	●	●	◐			●	●	*1	
															◐			●	●	●	●	◐			●	◐		
															◐			●	●	●	●	◐			●	●	◐	●
															◐			●	●	●	●	◐			●	●	◐	●
U3								◐			●	●	◐	◐	◐			●	●	●	●	◐			●	●	◐	◐
U4								◐			●	◐	●	●	◐			●	●	●	●	◐			●	●	◐	◐
															◐			●	●	●	●	◐			●	◐	◐	◐
UH								◐			◐	●	◐	◐	◐			●	●	●	●	◐			●	●	◐	◐
UF								◐			◐	◐	◐	◐	◐			●	●	●	●	◐			●	●	◐	◐

Display of contents of malfunction (first digit)

Display of contents of malfunction (second digit)

Display 1 of malfunction in detail

Display 2 of malfunction in detail

*1

● ●	Master
● ◐	Slave1
◐ ●	Slave2
◐ ◐	System

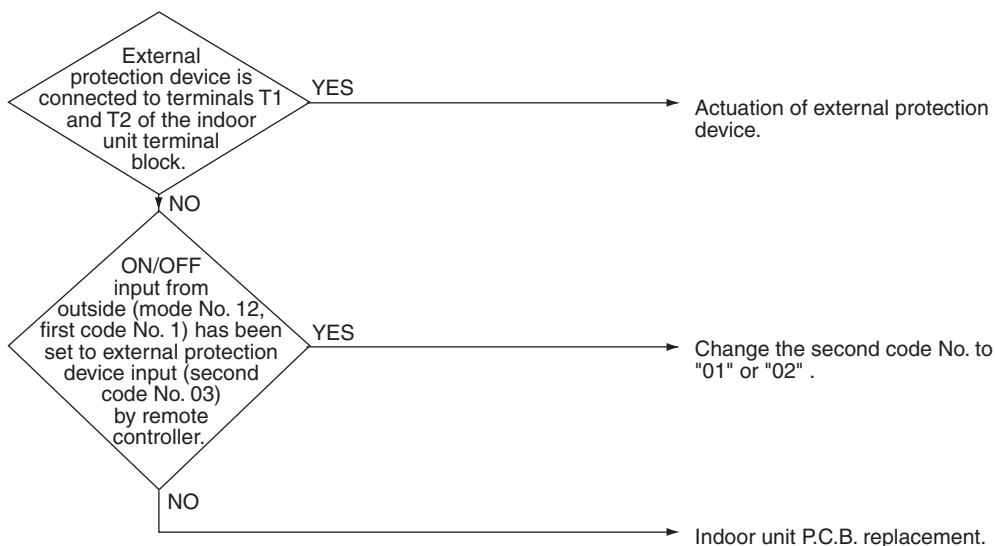
3. Troubleshooting by Indication on the Remote Controller

3.1 “80” Indoor Unit: Error of External Protection Device

Remote Controller Display	80
Applicable Models	All indoor unit models
Method of Malfunction Detection	
Malfunction Decision Conditions	
Supposed Causes	■ Actuation of external protection device ■ Improper field set ■ Defect of indoor unit P.C.B.
Troubleshooting	


Caution

Be sure to turn off the power switch before connecting or disconnecting the connector or parts could be damaged.



3.2 “A1” Indoor Unit: P.C.B. Defect

Remote
Controller
Display

A1

Applicable
Models

All indoor unit models

Method of
Malfunction
Detection

Check data from E²PROM.

Malfunction
Decision
Conditions

When data could not be correctly received from the E²PROM
E²PROM : Type of nonvolatile memory. Maintains memory contents even when the power supply is turned off.

Supposed
Causes

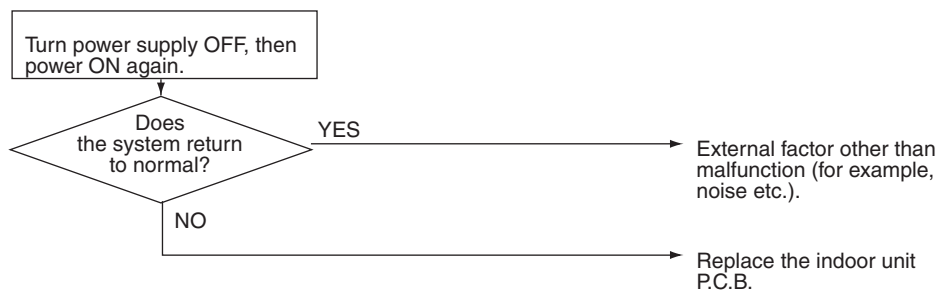
■ Defect of indoor unit P.C.B.

Troubleshooting



Caution

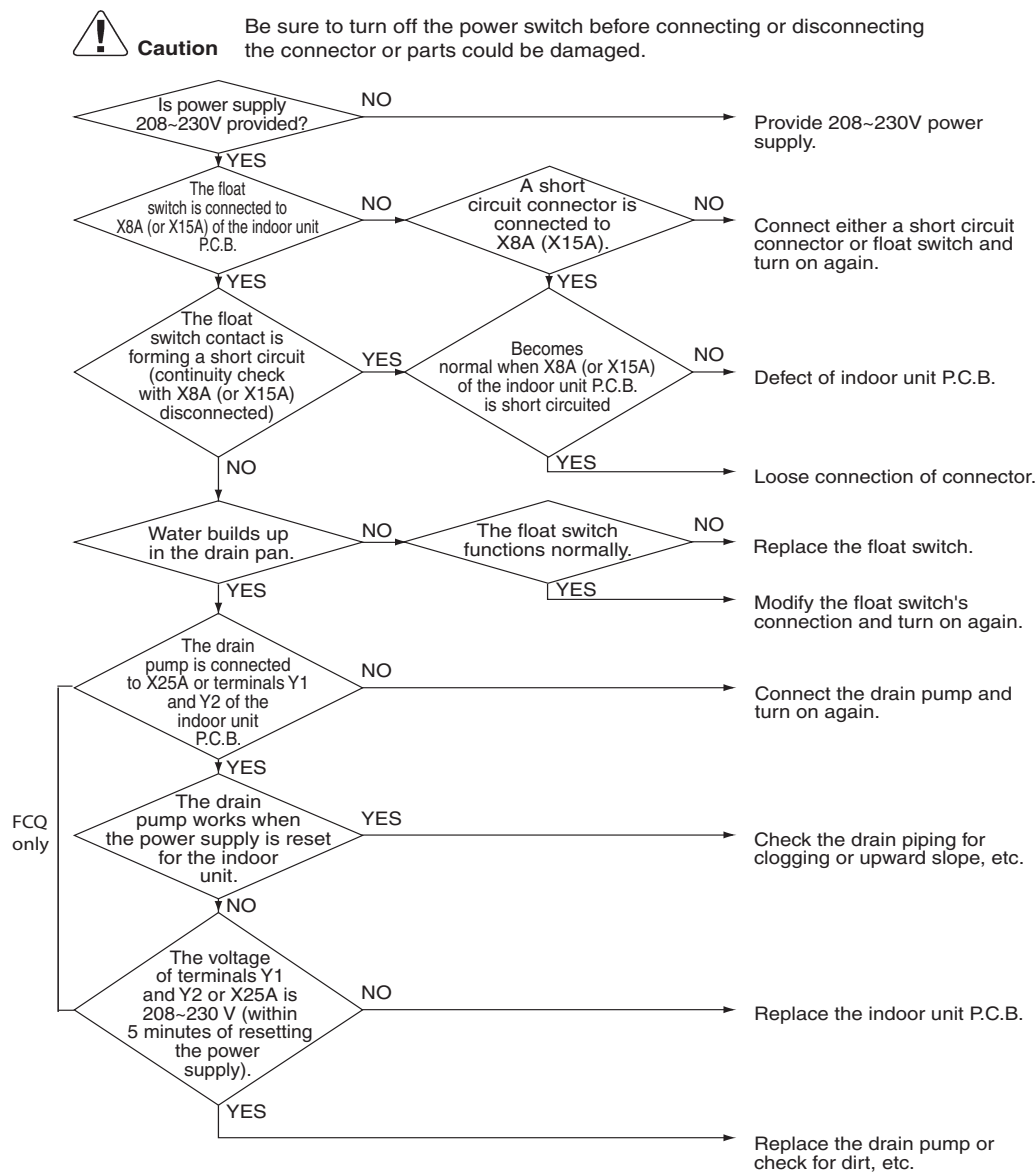
Be sure to turn off the power switch before connecting or disconnecting the connector or parts could be damaged.



3.3 “” Indoor Unit: Malfunction of Drain Level Control System (S1L)

Remote Controller Display	
Applicable Models	FCQ, FHQ (Option), FAQ (Option)
Method of Malfunction Detection	Float switch OFF detection
Malfunction Decision Conditions	When rise of water level is not a condition and the float switch goes OFF.
Supposed Causes	■ 208~230V power supply is not provided ■ Defect of float switch or short circuit connector ■ Defect of drain pump ■ Drain clogging, upward slope, etc. ■ Defect of indoor unit P.C.B. ■ Loose connection of connector

Troubleshooting



3.4 “FE” Indoor Unit: Fan Motor (M1F) Lock, Overload

Remote
Controller
Display

FE

Applicable
Models

All indoor unit models

Method of
Malfunction
Detection

Detection by failure of signal for detecting number of turns to come from the fan motor

Malfunction
Decision
Conditions

When the number of turns cannot be detected even when output voltage to the fan is maximum

Supposed
Causes

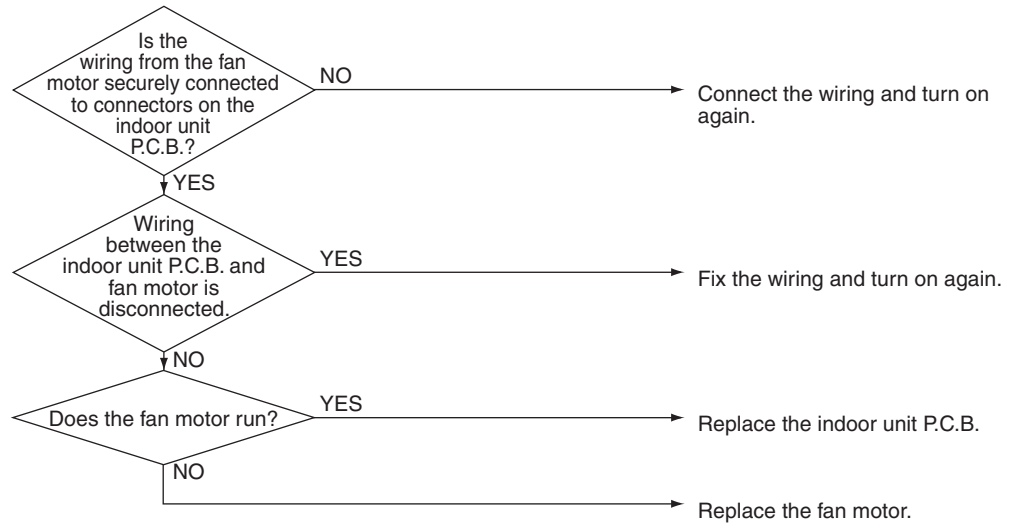
- Fan motor lock
- Disconnected or faulty wiring between fan motor and P.C.B.

Troubleshooting



Caution

Be sure to turn off the power switch before connecting or disconnecting the connector or parts could be damaged.



3.5 “**87**” Indoor Unit: Malfunction of Louver Motor (M1S)

Remote
Controller
Display

87

Applicable
Models

FCQ, FHQ, FAQ

Method of
Malfunction
Detection

Utilizes **ON/OFF** of the limit switch when the motor turns.

Malfunction
Decision
Conditions

When ON/OFF of the microswitch for positioning cannot be reversed even though the louver motor is energized for a specified amount of time (about 30 seconds).

Supposed
Causes

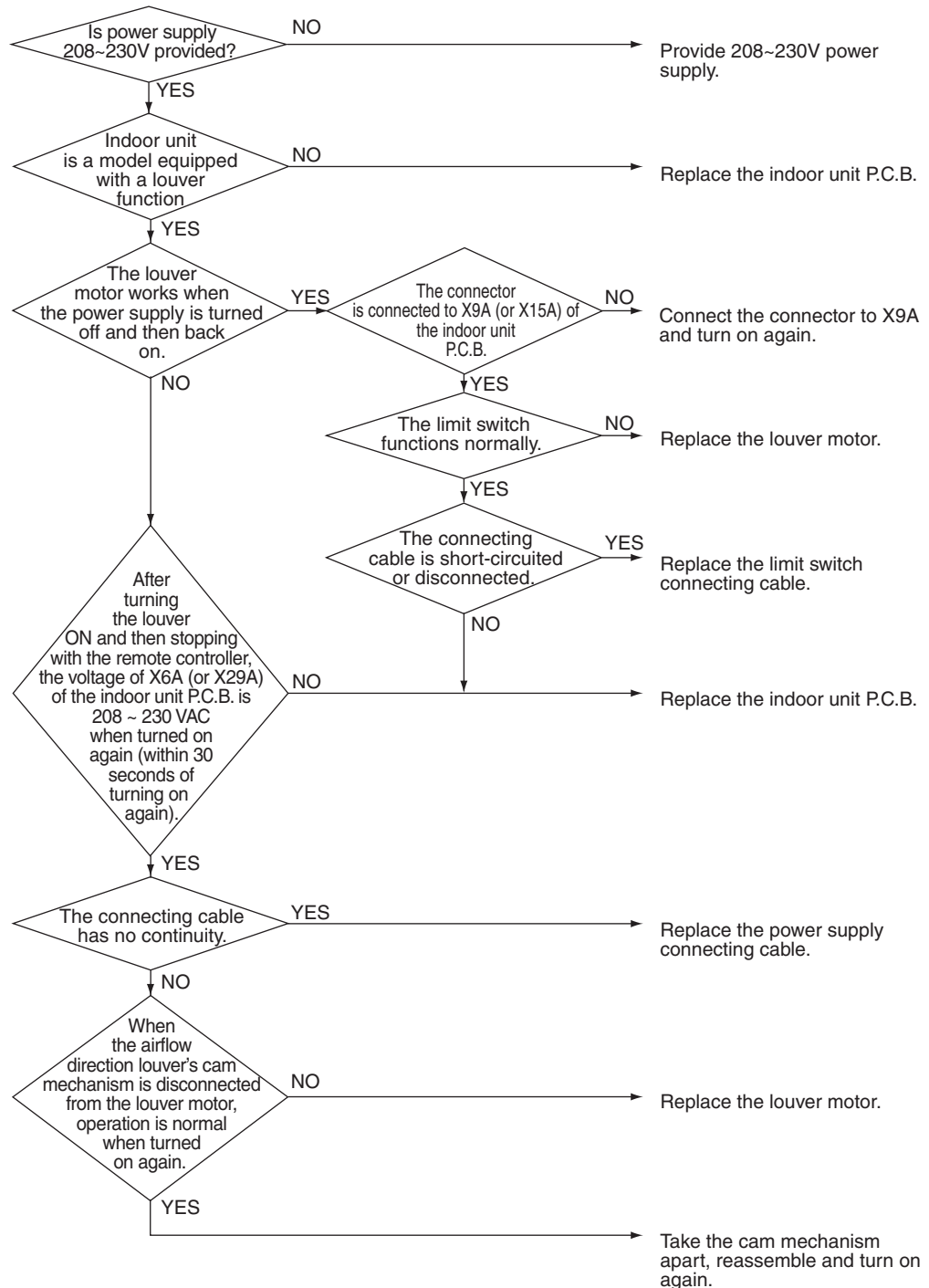
- Defect of louver motor
- Defect of connection cable (power supply and limit switch)
- Defect of airflow direction adjusting louver-cam
- Defect of indoor unit P.C.B.

Troubleshooting



Caution

Be sure to turn off the power switch before connecting or disconnecting the connector, or parts could be damaged.



3.6 “88” Indoor Unit: Malfunction of Moving Part of Electronic Expansion Valve (Y1E)

Remote
Controller
Display

88

Applicable
Models

All indoor unit models

Method of
Malfunction
Detection

Malfunction
Decision
Conditions

Supposed
Causes

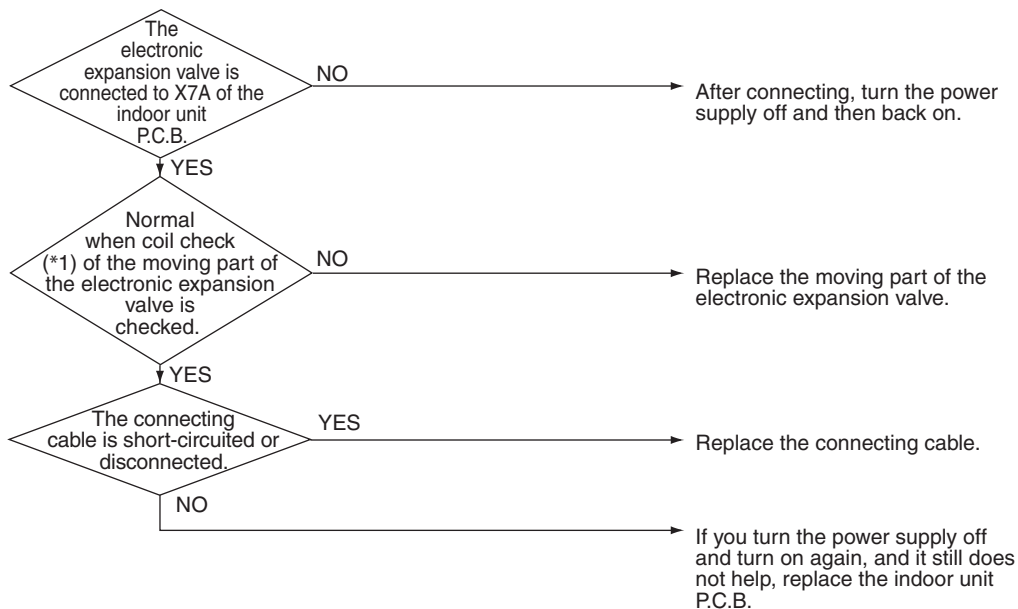
- Malfunction of moving part of electronic expansion valve
- Defect of indoor unit P.C.B.
- Defect of connecting cable

Troubleshooting



Caution

Be sure to turn off the power switch before connecting or disconnecting the connector, or parts could be damaged.



*1: Coil check method for the moving part of the electronic expansion valve

Disconnect the electronic expansion valve from the P.C.B. and check the continuity between the connector pins.

(Normal)

Pin No.	1. White	2. Yellow	3. Orange	4. Blue	5. Red	6. Brown
1. White		x	○ Approx. 300Ω	x	○ Approx. 150Ω	x
2. Yellow			x	○ Approx. 300Ω	x	○ Approx. 150Ω
3. Orange				x	○ Approx. 150Ω	x
4. Blue					x	○ Approx. 150Ω
5. Red						x
6. Brown						

○: Continuity

x: No continuity

3.7 “FF” Indoor Unit: Drain Level above Limit

Remote
Controller
Display

FF

Applicable
Models

FCQ

Method of
Malfunction
Detection

Water leakage is detected based on float switch ON/OFF operation while the compressor is in non-operation.

Malfunction
Decision
Conditions

When the float switch changes from ON to OFF while the compressor is in non-operation.

Supposed
Causes

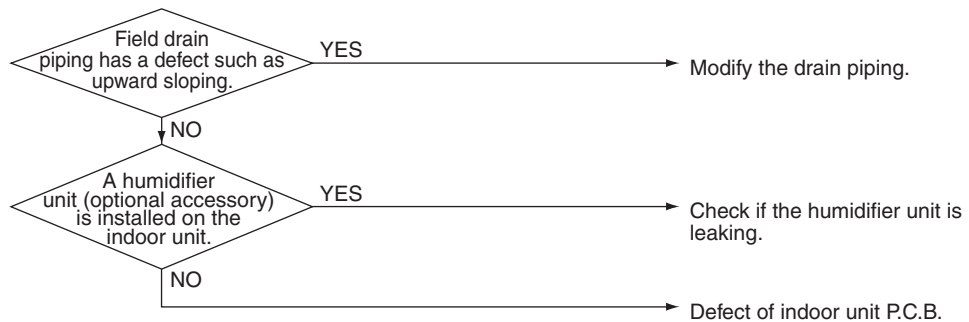
- Humidifier unit (optional accessory) leaking
- Defect of drain pipe (upward slope, etc.)
- Defect of indoor unit P.C.B.

Troubleshooting



Caution

Be sure to turn off the power switch before connecting or disconnecting the connector, or parts could be damaged.



3.8 “AU” Indoor Unit: Malfunction of Capacity Determination Device

Remote
controller display



Applicable
Models

All indoor unit models

Method of
Malfunction
Detection

Capacity is determined according to resistance of the capacity setting adaptor and the memory inside the IC memory on the indoor unit P.C.B., and whether the value is normal or abnormal is determined.

Malfunction
Decision
Conditions

Operation and:

1. When the capacity code is not contained in the P.C.B.'s memory, and the capacity setting adaptor is not connected.
2. When a capacity that doesn't exist for that unit is set.

Supposed
Causes

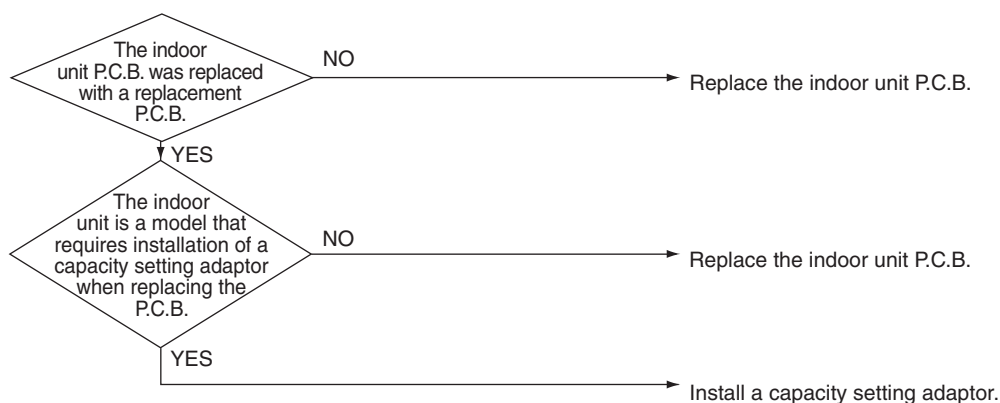
- You have forgotten to install the capacity setting adaptor.
- Defect of indoor unit P.C.B.

Troubleshooting



Caution

Be sure to turn off the power switch before connecting or disconnecting the connector, or parts could be damaged.



3.9 “E4” Indoor Unit: Malfunction of Thermistor (R2T) for Heat Exchanger

Remote
Controller
Display

E4

Applicable
Models

All indoor unit models

Method of
Malfunction
Detection

Malfunction detection is carried out by temperature detected by heat exchanger thermistor.

Malfunction
Decision
Conditions

When the heat exchanger thermistor becomes disconnected or shorted while the unit is running.

Supposed
Causes

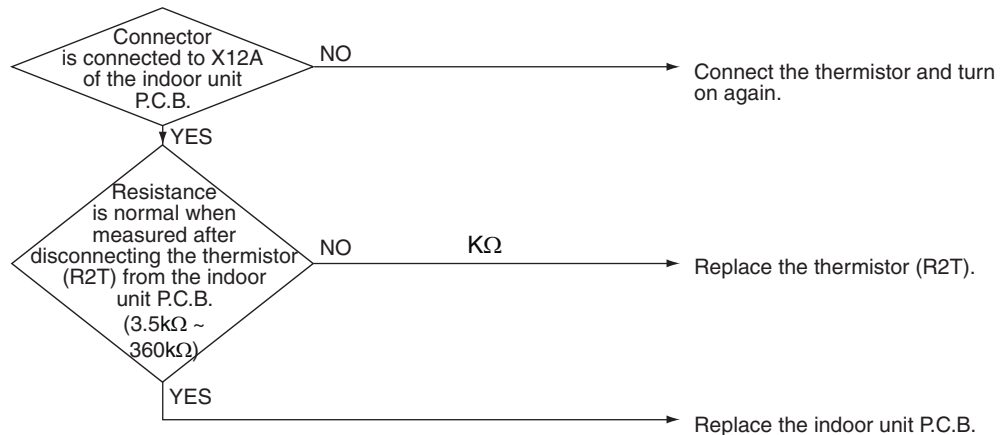
- Defect of thermistor (R2T) for liquid pipe
- Defect of indoor unit P.C.B.

Troubleshooting



Caution

Be sure to turn off the power switch before connecting or disconnecting the connector, or parts could be damaged.



* Refer to thermistor resistance / temperature characteristics table on P.166.

3.10 “E5” Indoor Unit: Malfunction of Thermistor (R3T) for Gas Pipes

Remote
Controller
Display

E5

Applicable
Models

All indoor unit models

Method of
Malfunction
Detection

Malfunction detection is carried out by temperature detected by gas pipe thermistor.

Malfunction
Decision
Conditions

When the gas pipe thermistor becomes disconnected or shorted while the unit is running.

Supposed
Causes

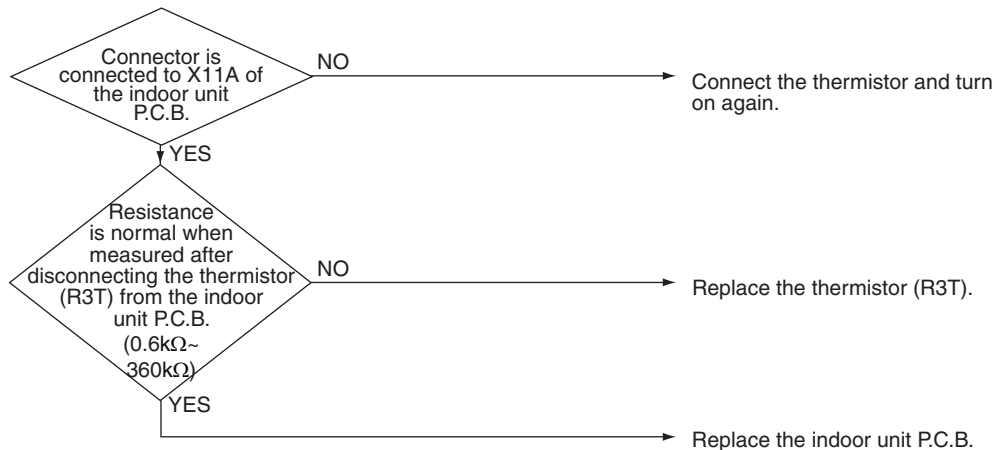
- Defect of indoor unit thermistor (R3T) for gas pipe
- Defect of indoor unit P.C.B.

Troubleshooting



Caution

Be sure to turn off the power switch before connecting or disconnecting the connector, or parts could be damaged.



* Refer to thermistor resistance / temperature characteristics table on P.166.

3.11 “E9” Indoor Unit: Malfunction of Thermistor (R1T) for Suction Air

Remote
Controller
Display

E9

Applicable
Models

All indoor unit models

Method of
Malfunction
Detection

Malfunction detection is carried out by temperature detected by suction air temperature thermistor.

Malfunction
Decision
Conditions

When the suction air temperature thermistor becomes disconnected or shorted while the unit is running.

Supposed
Causes

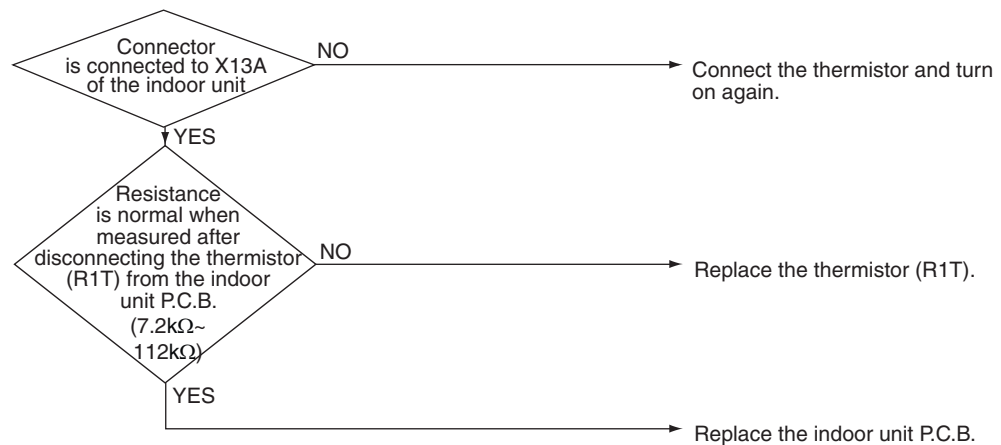
- Defect of indoor unit thermistor (R1T) for air inlet
- Defect of indoor unit P.C.B.

Troubleshooting



Caution

Be sure to turn off the power switch before connecting or disconnecting the connector, or parts could be damaged.



* Refer to thermistor resistance / temperature characteristics table on P.166.

3.12 “” Indoor Unit: Malfunction of Thermistor for Discharge Air

Remote
Controller
Display



Applicable
Models

All indoor unit models

Method of
Malfunction
Detection

Malfunction detection is carried out by temperature detected by discharge air temperature thermistor.

Malfunction
Decision
Conditions

When the discharge air temperature thermistor becomes disconnected or shorted while the unit is running.

Supposed
Causes

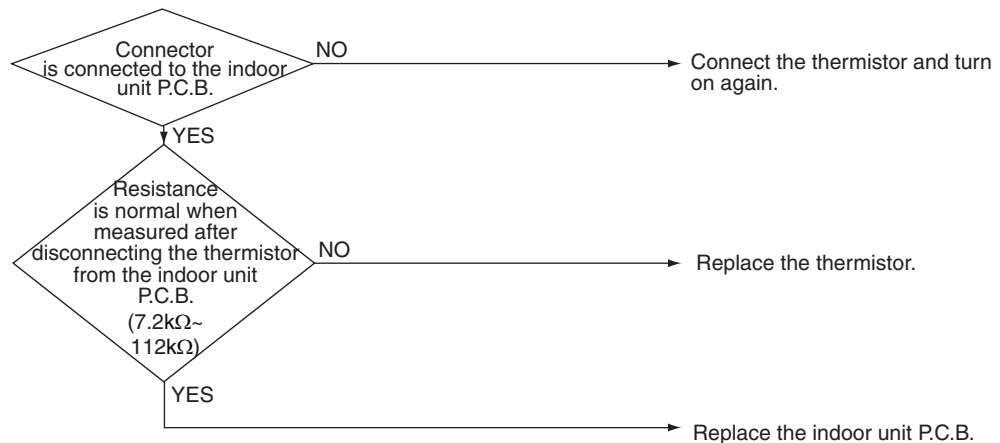
- Defect of indoor unit thermistor for air outlet
- Defect of indoor unit P.C.B.

Troubleshooting



Caution

Be sure to turn off the power switch before connecting or disconnecting the connector, or parts could be damaged.



* Refer to thermistor resistance / temperature characteristics table on P.166.

3.13 “” Indoor Unit: Malfunction of Thermostat Sensor in Remote Controller

Remote
Controller
Display



Applicable
Models

All indoor unit models

Method of
Malfunction
Detection

Malfunction detection is carried out by temperature detected by remote controller air temperature thermistor. (Note)

Malfunction
Decision
Conditions

When the remote controller air temperature thermistor becomes disconnected or shorted while the unit is running.

Supposed
Causes

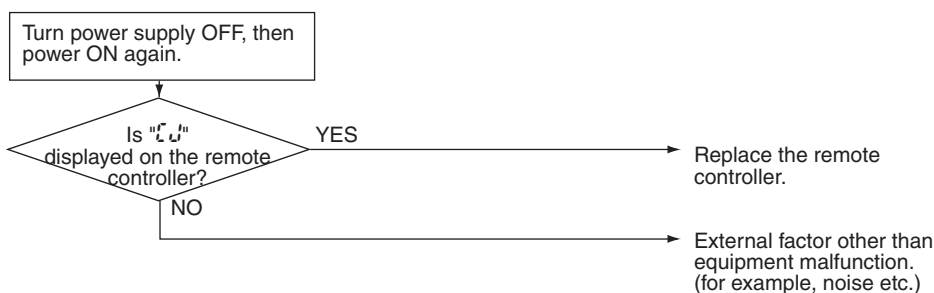
- Defect of remote controller thermistor
- Defect of remote controller P.C.B.

Troubleshooting



Caution

Be sure to turn off the power switch before connecting or disconnecting the connector, or parts could be damaged.



Note:

In case of remote controller thermistor malfunction, unit is still operable by suction air thermistor on indoor unit.



* Refer to thermistor resistance / temperature characteristics table on P.166.

3.14 “E1” Outdoor Unit: P.C.B. Defect

Remote
Controller
Display

E1

Applicable
Models

RZQ18~30PVJU

Method of
Malfunction
Detection

Check data from E²PROM

Malfunction
Decision
Conditions

When data could not be correctly received from the E²PROM
E²PROM : Type of nonvolatile memory. Maintains memory contents even when the power supply is turned off.

Supposed
Causes

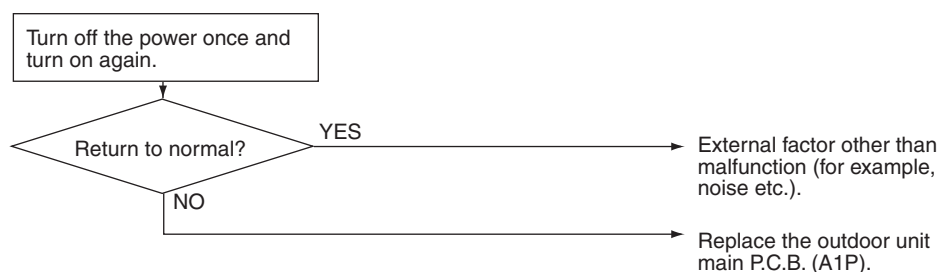
- Defect of outdoor unit P.C.B. (A1P)

Troubleshooting



Caution

Be sure to turn off the power switch before connecting or disconnecting the connector, or parts could be damaged.



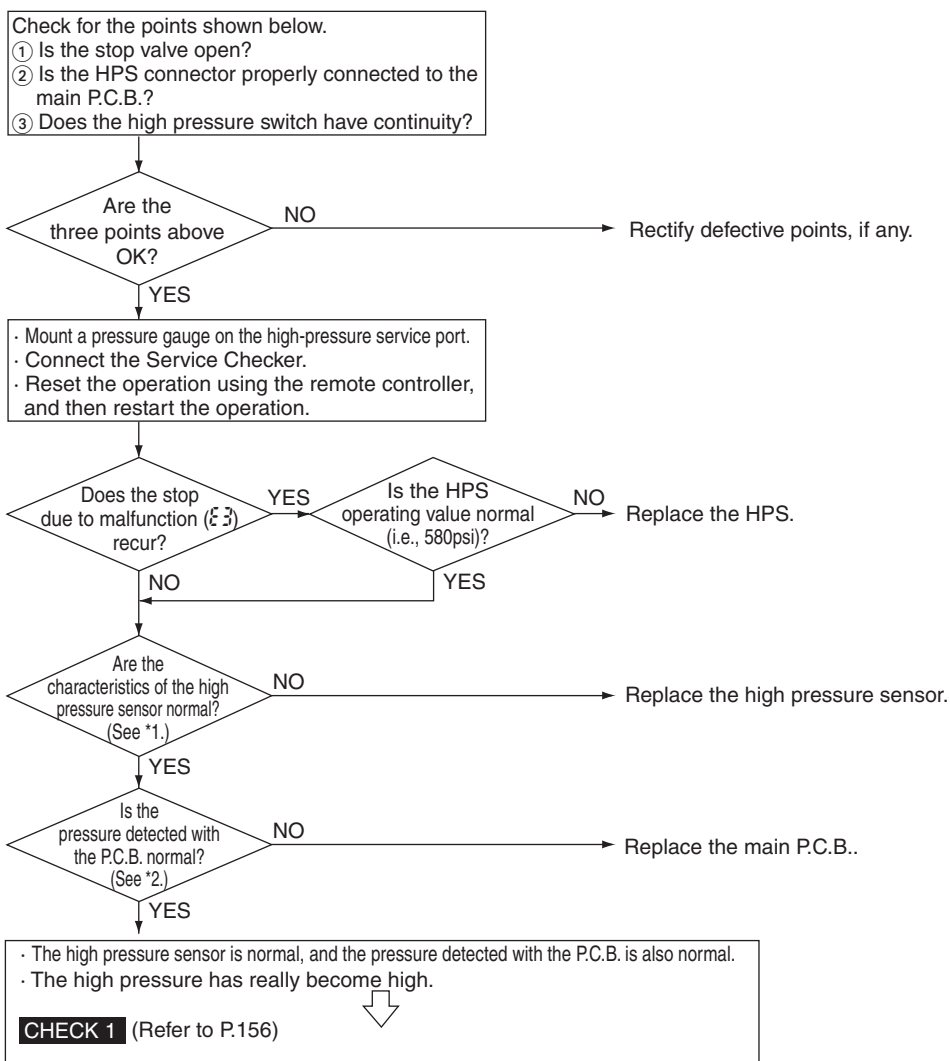
3.15 “E3” Outdoor Unit: Actuation of High Pressure Switch

Remote Controller Display	E3
Applicable Models	RZQ18~30PVJU
Method of Malfunction Detection	Abnormality is detected when the contact of the high pressure protection switch opens.
Malfunction Decision Conditions	Error is generated when the HPS activation count reaches the number specific to the operation mode. (Reference) Operating pressure of high pressure switch Operating pressure: 580 psi Reset pressure: 435 psi
Supposed Causes	■ Actuation of outdoor unit high pressure switch ■ Defect of High pressure switch ■ Defect of outdoor unit P.C.B. ■ Instantaneous power failure ■ Faulty high pressure sensor

Troubleshooting



Caution Be sure to turn off the power switch before connecting or disconnecting the connector, or parts could be damaged.

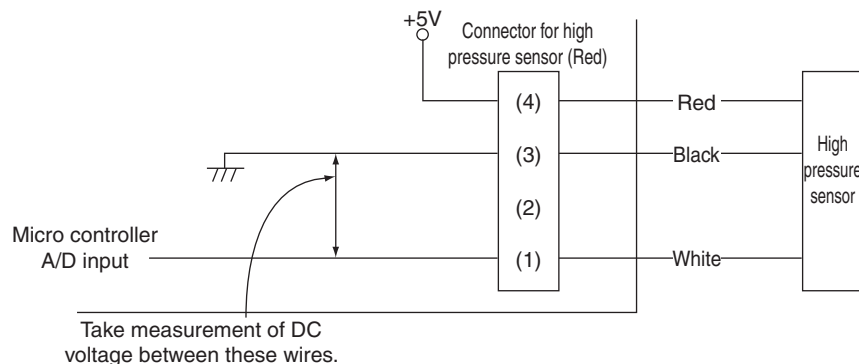


*1: Make a comparison between the voltage of the pressure sensor and that read by the pressure gauge.

(As to the voltage of the pressure sensor, take the measurement of voltage at the connector, and then convert it to pressure according to information on P.168.)

*2: Make a comparison between the high pressure value checked with the Service Checker and the voltage of the pressure sensor (see *1).

*3: Take measurement of voltage of the pressure sensor.



3.16 “E4” Outdoor Unit: Actuation of Low Pressure Sensor

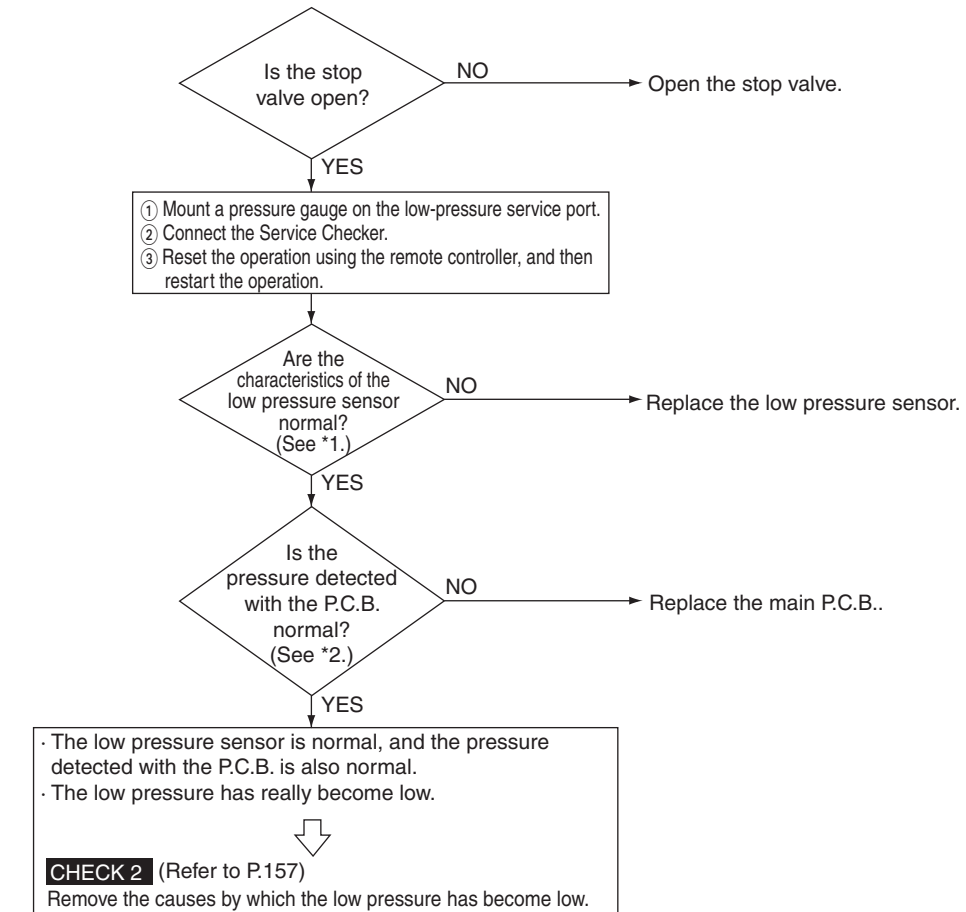
Remote Controller Display	E4
Applicable Models	RZQ18~30PVJU
Method of Malfunction Detection	Abnormality is detected by the pressure value with the low pressure sensor.
Malfunction Decision Conditions	Error is generated when the low pressure is dropped under specific pressure. Operating pressure:10psi
Supposed Causes	■ Abnormal drop of low pressure (Lower than 10 psi) ■ Defect of low pressure sensor ■ Defect of outdoor unit P.C.B. ■ Stop valve is not opened.

Troubleshooting



Caution

Be sure to turn off the power switch before connecting or disconnecting the connector, or parts could be damaged.

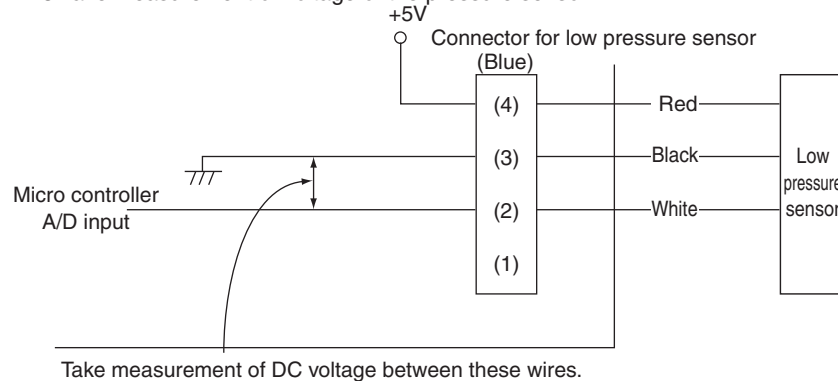


*1: Make a comparison between the voltage of the pressure sensor and that read by the pressure gauge.

(As to the voltage of the pressure sensor, make measurement of voltage at the connector, and then convert it to pressure according to information on P.168.)

*2: Make a comparison between the low pressure value checked with the Service Checker and the voltage of the pressure sensor (see *1).

*3: Take measurement of voltage of the pressure sensor.



3.17 “E5” Inverter Compressor Motor Lock

**Remote
Controller
Display**

E5

**Applicable
Models**

RZQ18~30PVJU

**Method of
Malfunction
Detection**

Inverter P.C.B. takes the position signal from UVW line connected between the inverter and compressor, and the malfunction is detected when any abnormality is observed in the phase-current waveform.

**Malfunction
Decision
Conditions**

This malfunction will be output when the inverter compressor motor does not start up even in forced startup mode.

**Supposed
Causes**

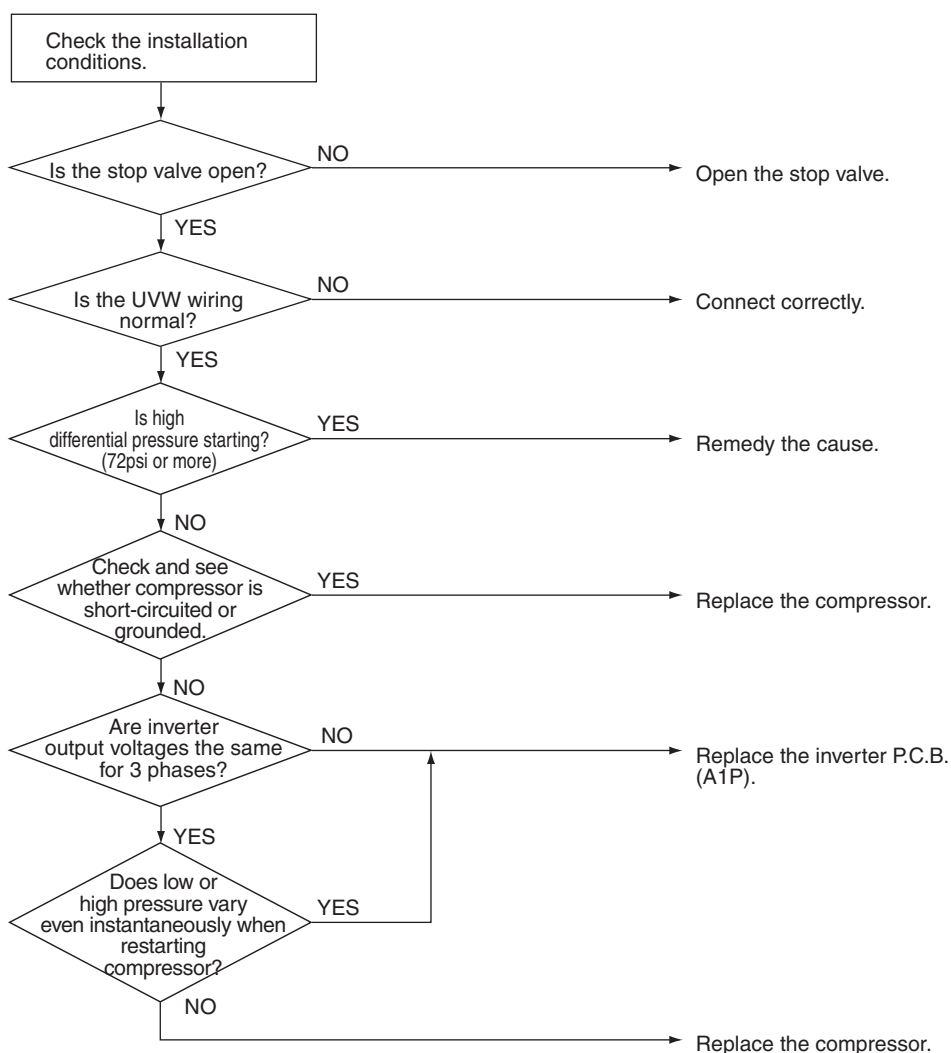
- Compressor lock
- High differential pressure (72psi or more)
- Incorrect UVW wiring
- Faulty inverter P.C.B.
- Stop valve is left in closed position.

Troubleshooting



Caution

Be sure to turn off the power switch before connecting or disconnecting the connector, or parts could be damaged.



3.18 “E7” Malfunction of Outdoor Unit Fan Motor

Remote
Controller
Display

E7

Applicable
Models

RZQ18~30PVJU

Method of
Malfunction
Detection

Malfunction of fan motor system is detected according to the fan speed detected by hall IC when the fan motor runs.

Malfunction
Decision
Conditions

- When the fan runs with speed less than a specified one for 6 seconds or more when the fan motor running conditions are met
- When malfunction is generated 4 times, the system shuts down.

Supposed
Causes

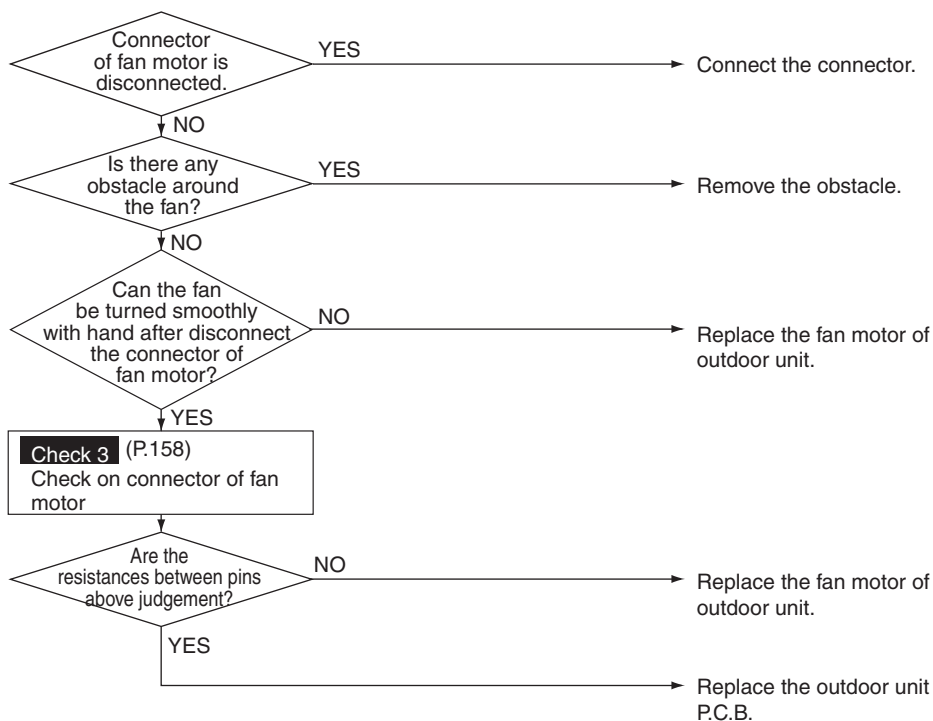
- Malfunction of fan motor
- The harness connector between fan motor and P.C.B. is left in disconnected, or faulty connector
- Fan does not run due to foreign matters tangled
- Clearing condition: Operate for 5 minutes (normal)

Troubleshooting



Caution

Be sure to turn off the power switch before connecting or disconnecting the connector, or parts could be damaged.



3.19 “E3” Outdoor Unit: Malfunction of Moving Part of Electronic Expansion Valve (Y1E)

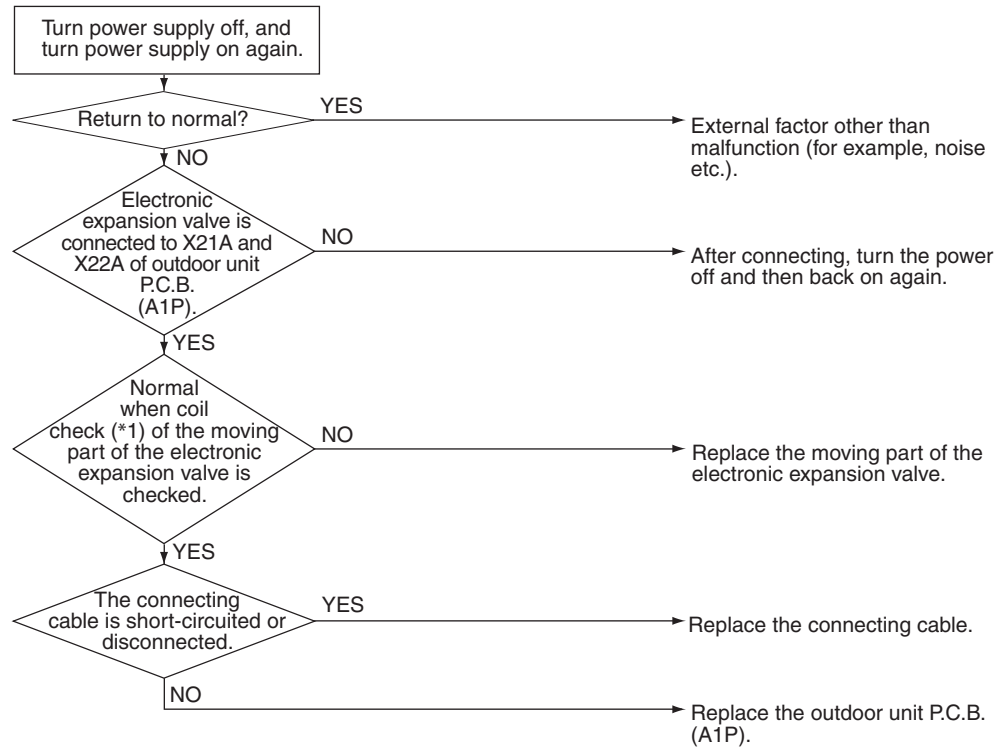
Remote Controller Display	E3
Applicable Models	RZQ18~30PVJU
Method of Malfunction Detection	Check disconnection of connector Check continuity of expansion valve coil
Malfunction Decision Conditions	Error is generated under no common power supply when the power is on.
Supposed Causes	■ Defect of moving part of electronic expansion valve ■ Defect of outdoor unit P.C.B. (A1P) ■ Defect of connecting cable

Troubleshooting

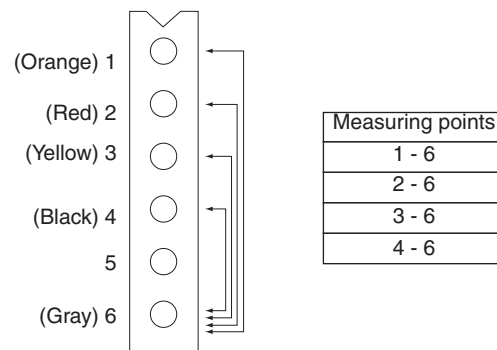


Caution

Be sure to turn off the power switch before connecting or disconnecting the connector, or parts could be damaged.



*Make measurement of resistance between the connector pins, and then make sure the resistance falls in the range of 40 to 50kΩ.



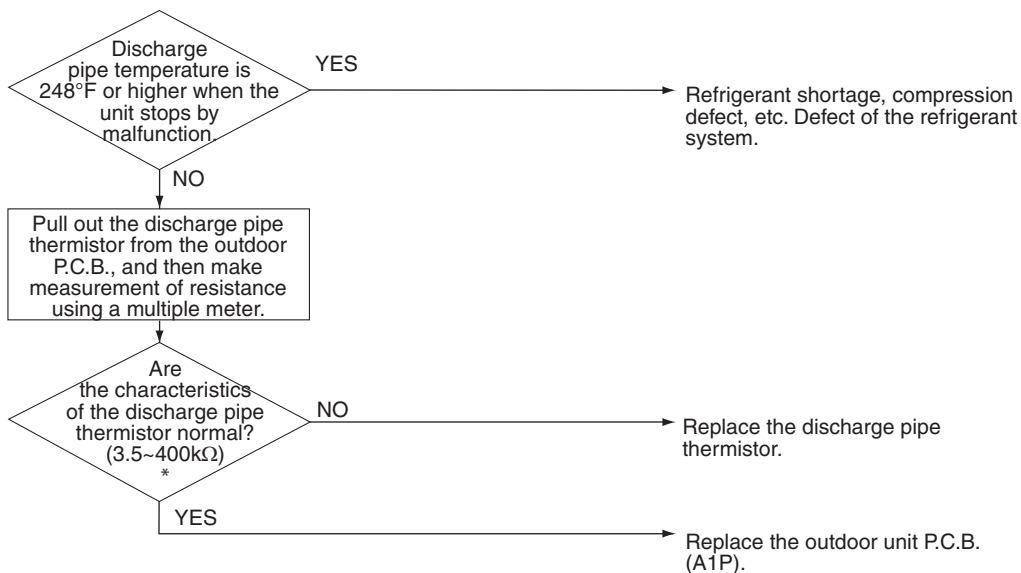
3.20 “F3” Outdoor Unit: Abnormal Discharge Pipe Temperature

Remote Controller Display	F3
Applicable Models	RZQ18~30PVJU
Method of Malfunction Detection	Abnormality is detected according to the temperature detected by the discharge pipe temperature sensor.
Malfunction Decision Conditions	When the discharge pipe temperature rises to an abnormally high level When the discharge pipe temperature rises suddenly
Supposed Causes	■ Faulty discharge pipe temperature sensor ■ Faulty connection of discharge pipe temperature sensor ■ Faulty outdoor unit P.C.B.

Troubleshooting


Caution

Be sure to turn off the power switch before connecting or disconnecting the connector, or parts could be damaged.



Refer to “Thermistor Resistance / Temperature Characteristics” table on P.166.

3.21 “FE” Outdoor Unit: Refrigerant Overcharged

Remote
Controller
Display

FE

Applicable
Models

RZQ18~30PVJU

Method of
Malfunction
Detection

Excessive charging of refrigerant is detected by using the heat exchanging deicer temperature during a check operation.

Malfunction
Decision
Conditions

When the amount of refrigerant, which is calculated by using the heat exchanging deicer temperature during a check run, exceeds the standard.

Supposed
Causes

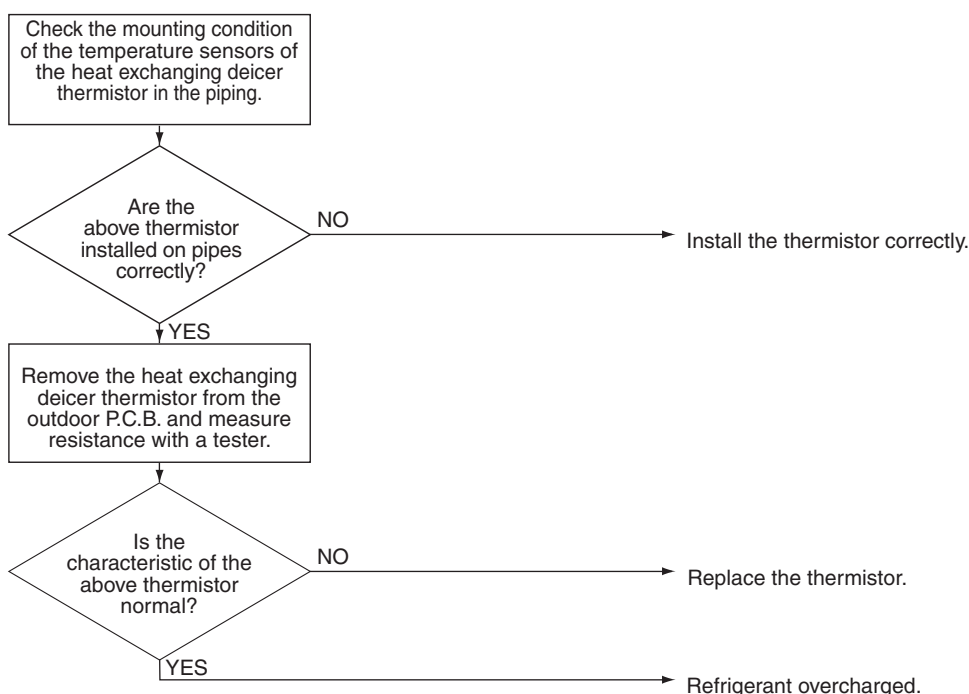
- Refrigerant overcharge
- Misalignment of the thermistor for heat exchanger
- Defect of the thermistor for heat exchanger

Troubleshooting



Caution

Be sure to turn off the power switch before connecting or disconnecting the connector, or parts could be damaged.



Refer to “Thermistor Resistance / Temperature Characteristics” table on P.166.

3.22 “H3” Outdoor Unit: Malfunction of Thermistor (R1T) for Outdoor Air

Remote
Controller
Display

H3

Applicable
Models

RZQ18~30PVJU

Method of
Malfunction
Detection

Malfunction is detected from the temperature detected by the outdoor air thermistor.

Malfunction
Decision
Conditions

When the outside air temperature thermistor has short circuit or open circuit.

Supposed
Causes

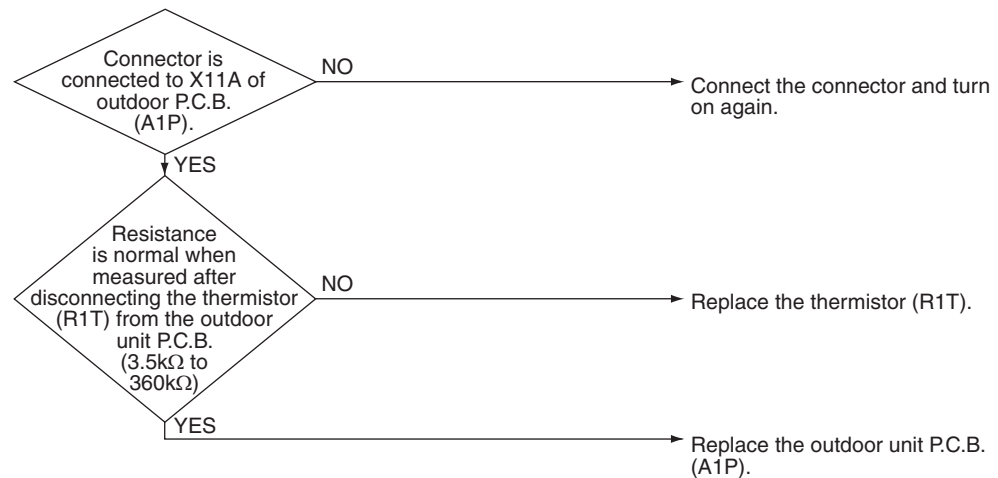
- Defect of thermistor (R1T) for outdoor air
- Defect of outdoor unit P.C.B. (A1P)

Troubleshooting



Caution

Be sure to turn off the power switch before connecting or disconnecting the connector, or parts could be damaged.



Refer to “Thermistor Resistance / Temperature Characteristics” table on P.166.

3.23 “” Outdoor Unit: Malfunction of Discharge Pipe Thermistor (R2T)

Remote
Controller
Display



Applicable
Models

RZQ18~30PVJU

Method of
Malfunction
Detection

Malfunction is detected from the temperature detected by discharge pipe temperature thermistor.

Malfunction
Decision
Conditions

When a short circuit or an open circuit in the discharge pipe temperature thermistor is detected.

Supposed
Causes

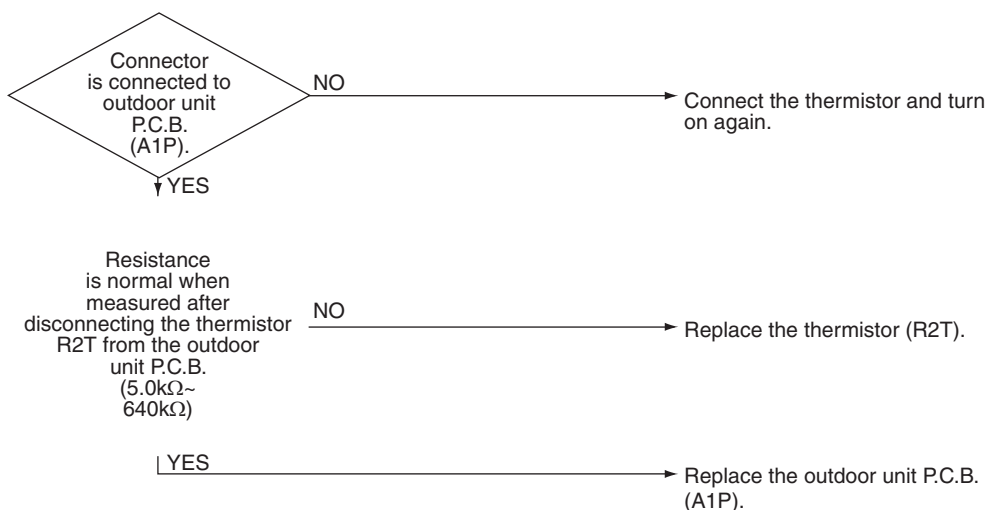
- Defect of thermistor (R2T) for outdoor unit discharge pipe
- Defect of outdoor unit P.C.B. (A1P)

Troubleshooting



Caution

Be sure to turn off the power switch before connecting or disconnecting the connector, or parts could be damaged.



Refer to **Thermistor Resistance / Temperature Characteristics** table on P.167.

3.24 “U5” Outdoor Unit: Malfunction of Thermistor (R3T, R5T) for Suction Pipe 1, 2

Remote
Controller
Display

U5

Applicable
Models

RZQ18~30PVJU

Method of
Malfunction
Detection

Malfunction is detected from the temperature detected by the thermistor for suction pipe 1, 2.

Malfunction
Decision
Conditions

When a short circuit or an open circuit in the thermistor for suction pipe 1, 2 are detected.

Supposed
Causes

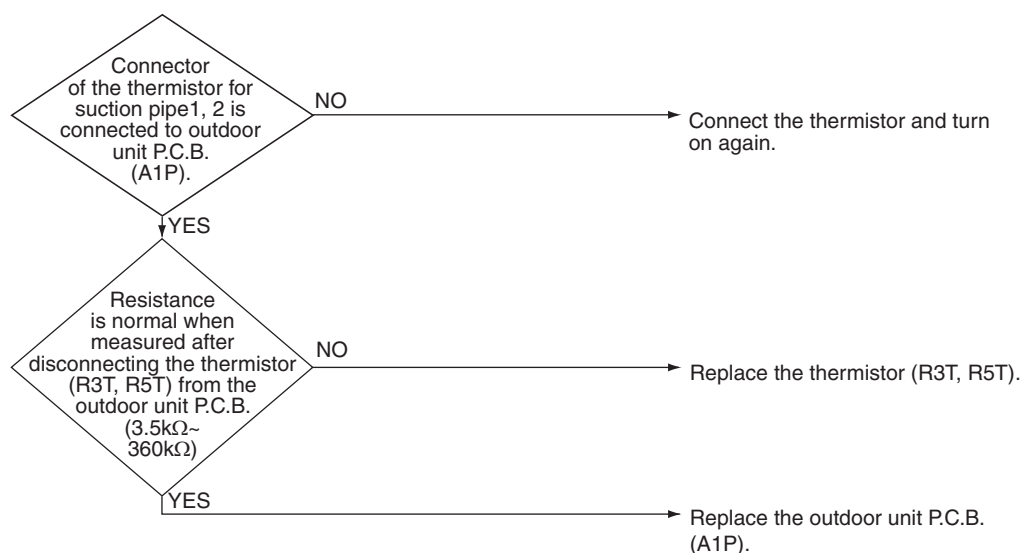
- Defect of thermistor (R3T, R5T) for outdoor unit suction pipe
- Defect of outdoor unit P.C.B. (A1P)

Troubleshooting



Caution

Be sure to turn off the power switch before connecting or disconnecting the connector, or parts could be damaged.



Refer to **Thermistor Resistance / Temperature Characteristics** table on P.166.

3.25 “” Outdoor Unit: Malfunction of Thermistor (R4T) for Outdoor Unit Heat Exchanger

Remote
Controller
Display



Applicable
Models

RZQ18~30PVJU

Method of
Malfunction
Detection

Malfunction is detected from the temperature detected by the heat exchanger thermistor.

Malfunction
Decision
Conditions

When a short circuit or an open circuit in the heat exchange thermistor is detected.

Supposed
Causes

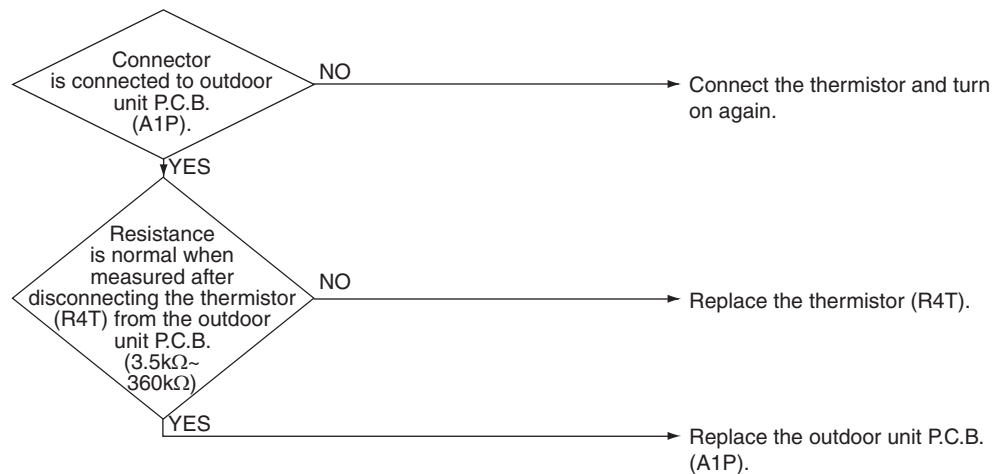
- Defect of thermistor (R4T) for outdoor unit heat exchanger
- Defect of outdoor unit P.C.B. (A1P)

Troubleshooting



Caution

Be sure to turn off the power switch before connecting or disconnecting the connector, or parts could be damaged.



Refer to **Thermistor Resistance / Temperature Characteristics** table on P.166

3.26 “” Outdoor Unit: Malfunction of High Pressure Sensor

Remote
Controller
Display



Applicable
Models

RZQ18~30PVJU

Method of
Malfunction
Detection

Malfunction is detected from the pressure detected by the high pressure sensor.

Malfunction
Decision
Conditions

When the high pressure sensor is short circuit or open circuit.

Supposed
Causes

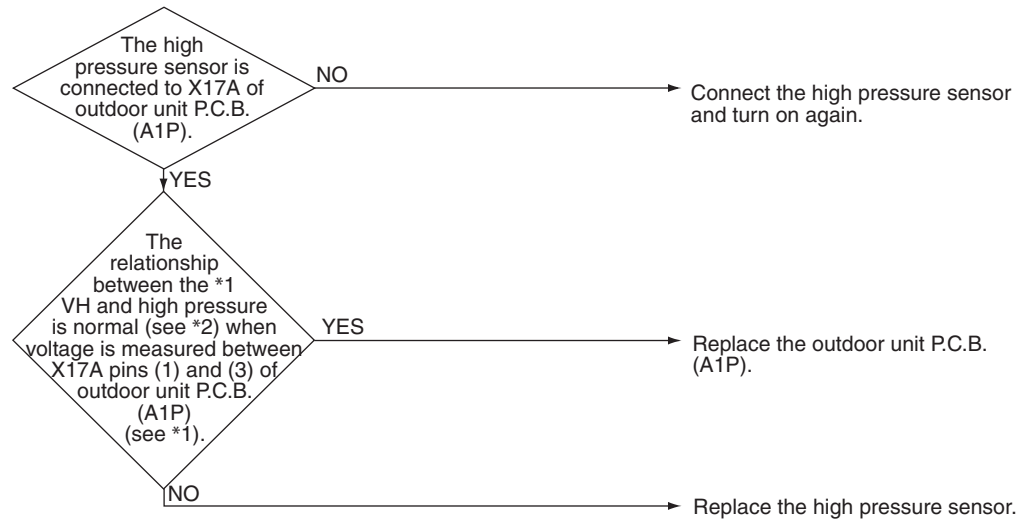
- Defect of high pressure sensor
- Connection of low pressure sensor with wrong connection.
- Defect of outdoor unit P.C.B.

Troubleshooting

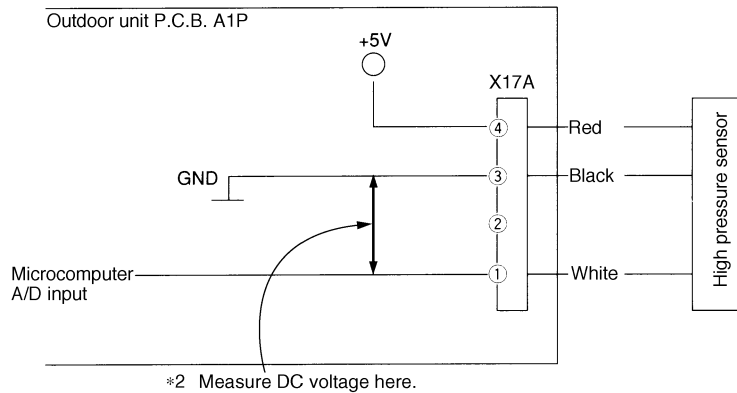


Caution

Be sure to turn off the power switch before connecting or disconnecting the connector, or parts could be damaged.



*1: Voltage measurement point



*2: Refer to **Pressure Sensor, Pressure / Voltage Characteristics** table on P.168.

3.27 “” Outdoor Unit: Malfunction of Low Pressure Sensor

Remote
Controller
Display



Applicable
Models

RZQ18~30PVJU

Method of
Malfunction
Detection

Malfunction is detected from pressure detected by low pressure sensor.

Malfunction
Decision
Conditions

When the low pressure sensor is short circuit or open circuit.

Supposed
Causes

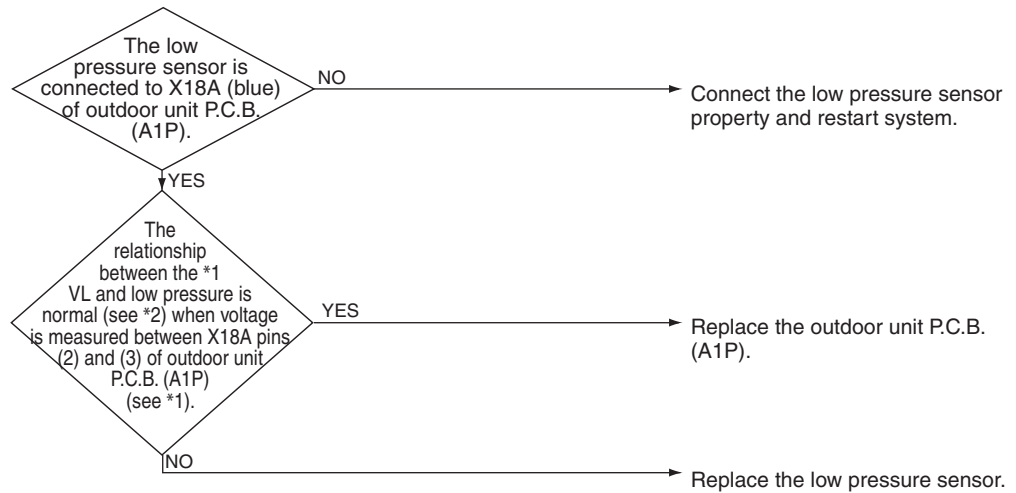
- Defect of low pressure sensor
- Connection of high pressure sensor with wrong connection.
- Defect of outdoor unit P.C.B.

Troubleshooting

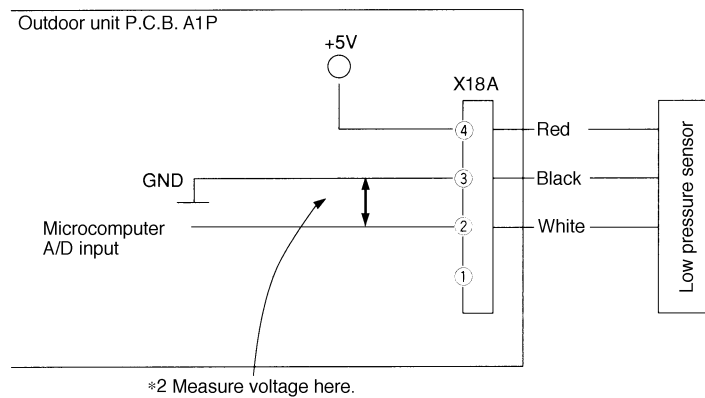


Caution

Be sure to turn off the power switch before connecting or disconnecting the connector, or parts could be damaged.



*1: Voltage measurement point



*2: Refer to **Pressure Sensor, Pressure / Voltage Characteristics** table on P.168.

3.28 “L I” Outdoor Unit: Malfunction of P.C.B.

Remote
Controller
Display

L I

Applicable
Models

RZQ18~30PVJU

Method of
Malfunction
Detection

- Detect malfunctions by current value during waveform output before compressor startup.
- Detect malfunctions by current sensor value during synchronized operation at the time of startup.
- Detect malfunctions using an SP-PAM series capacitor overvoltage sensor.

Malfunction
Decision
Conditions

- In case of overcurrent (OCP) during waveform output
- When the current sensor malfunctions during synchronized operation
- When overvoltage occurs in SP-PAM
- In case of IGBT malfunction

Supposed
Causes

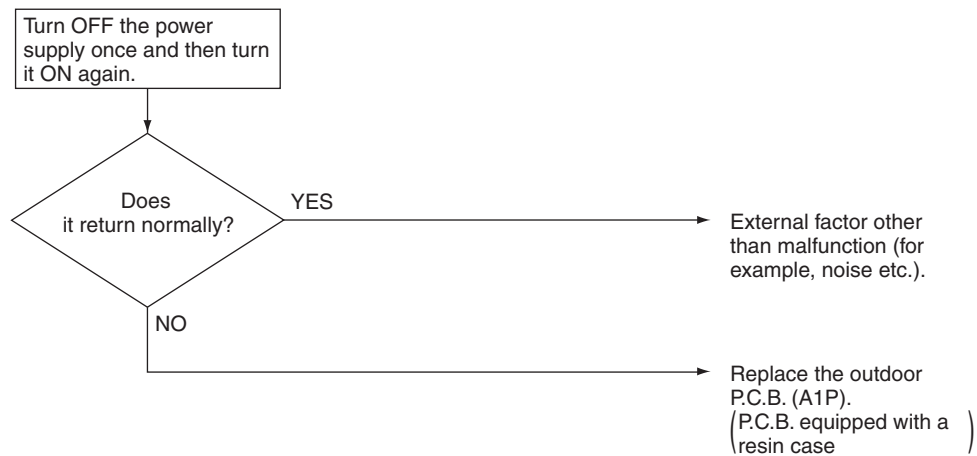
- Faulty outdoor P.C.B. (A1P)
 - IPM failure
 - Current sensor failure
 - SP-PAM failure
 - Failure of IGBT or drive circuit

Troubleshooting



Caution

Be sure to turn off the power switch before connecting or disconnecting the connector, or parts could be damaged.



3.29 “L4” Outdoor Unit: Malfunction of Inverter Radiating Fin Temperature Rise

Remote
Controller
Display

L4

Applicable
Models

RZQ18~30PVJU

Method of
Malfunction
Detection

Fin temperature is detected by the thermistor of the radiation fin.

Malfunction
Decision
Conditions

When the temperature of the inverter radiation fin increases above 180°F.

Supposed
Causes

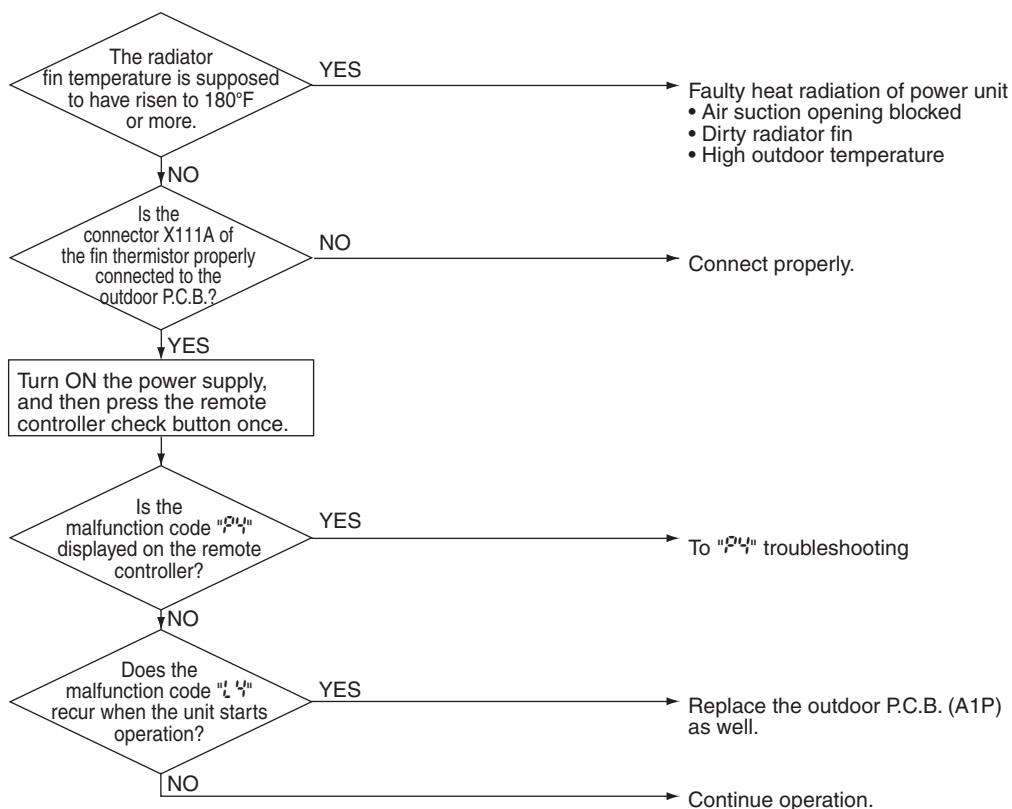
- Actuation of fin thermal (Actuates above 180°F)
- Defect of inverter P.C.B.
- Defect of fin thermistor

Troubleshooting



Caution

Be sure to turn off the power switch before connecting or disconnecting the connector, or parts could be damaged.



3.30 “L5” Outdoor Unit: Inverter Compressor Abnormal

Remote
Controller
Display

L5

Applicable
Models

RZQ18~30PVJU

Method of
Malfunction
Detection

Malfunction is detected from current flowing in the power transistor.

Malfunction
Decision
Conditions

When an excessive current flows in the power transistor.
(Instantaneous overcurrent also causes activation.)

Supposed
Causes

- Defect of compressor coil (disconnected, defective insulation)
- Compressor start-up malfunction (mechanical lock)
- Defect of inverter P.C.B.

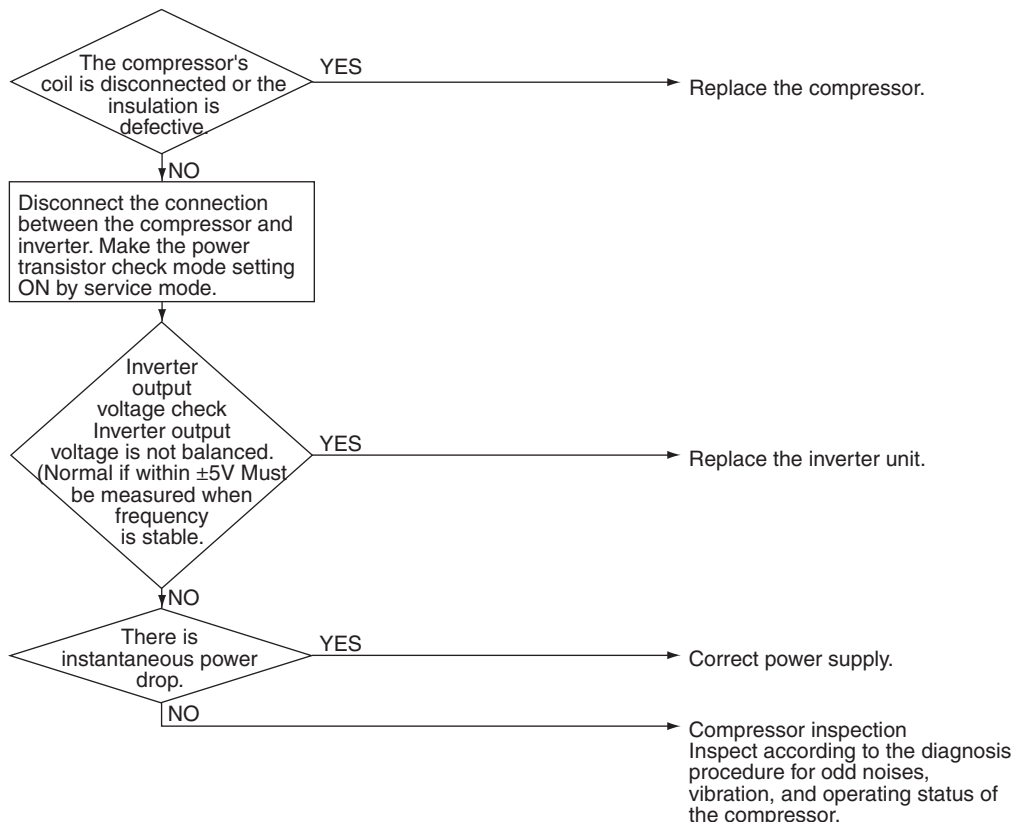
Troubleshooting



Caution

Be sure to turn off the power switch before connecting or disconnecting the connector, or parts could be damaged.

Compressor inspection



Higher voltage than actual is displayed when the inverter output voltage is checked by tester.

3.31 “L8” Outdoor Unit: Inverter Current Abnormal

Remote
Controller
Display

L8

Applicable
Models

RZQ18~30PVJU

Method of
Malfunction
Detection

Malfunction is detected by current flowing in the power transistor.

Malfunction
Decision
Conditions

When overload in the compressor is detected.

Supposed
Causes

- Compressor overload
- Compressor coil disconnected
- Defect of outdoor unit P.C.B. (A1P)

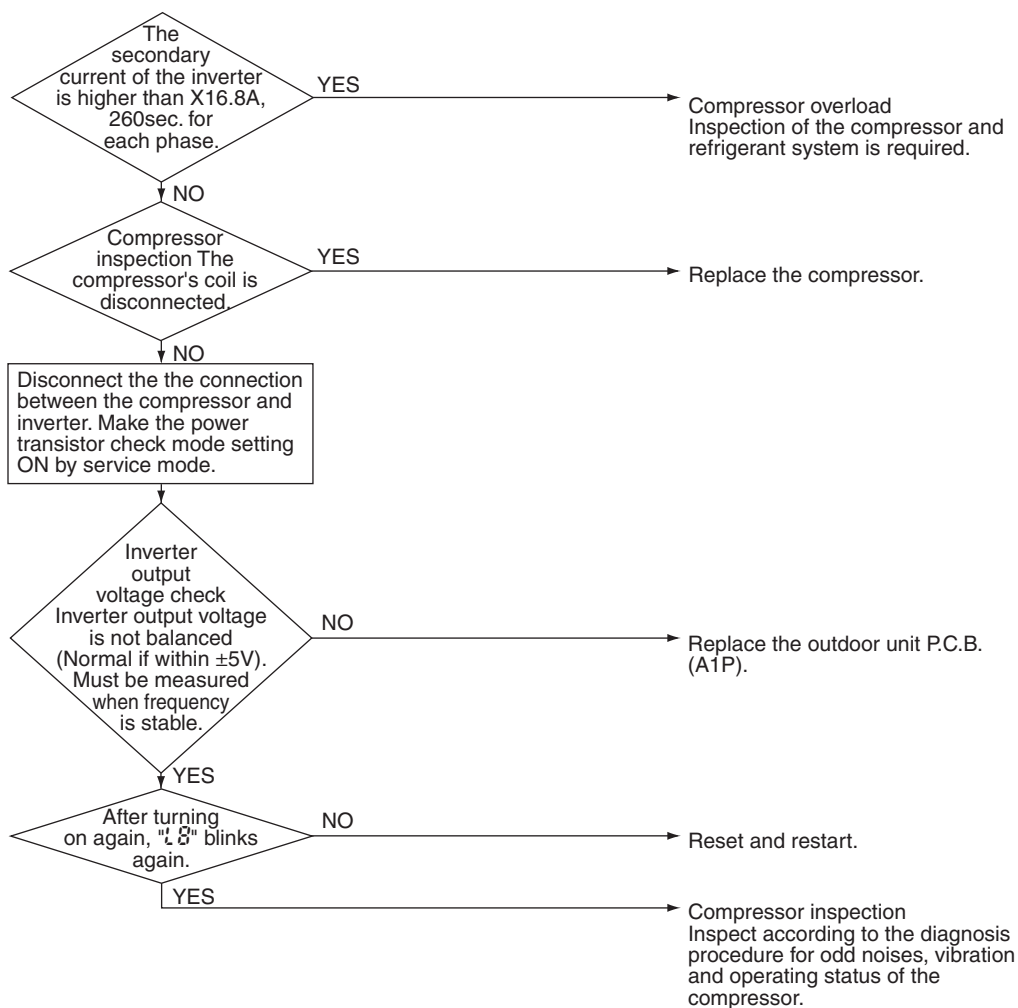
Troubleshooting



Caution

Be sure to turn off the power switch before connecting or disconnecting the connector, or parts could be damaged.

Output current check



3.32 “L9” Outdoor Unit: Inverter Start up Error

Remote
Controller
Display

L9

Applicable
Models

RZQ18~30PVJU

Method of
Malfunction
Detection

Malfunction is detected from current flowing in the power transistor.

Malfunction
Decision
Conditions

When overload in the compressor is detected during startup

Supposed
Causes

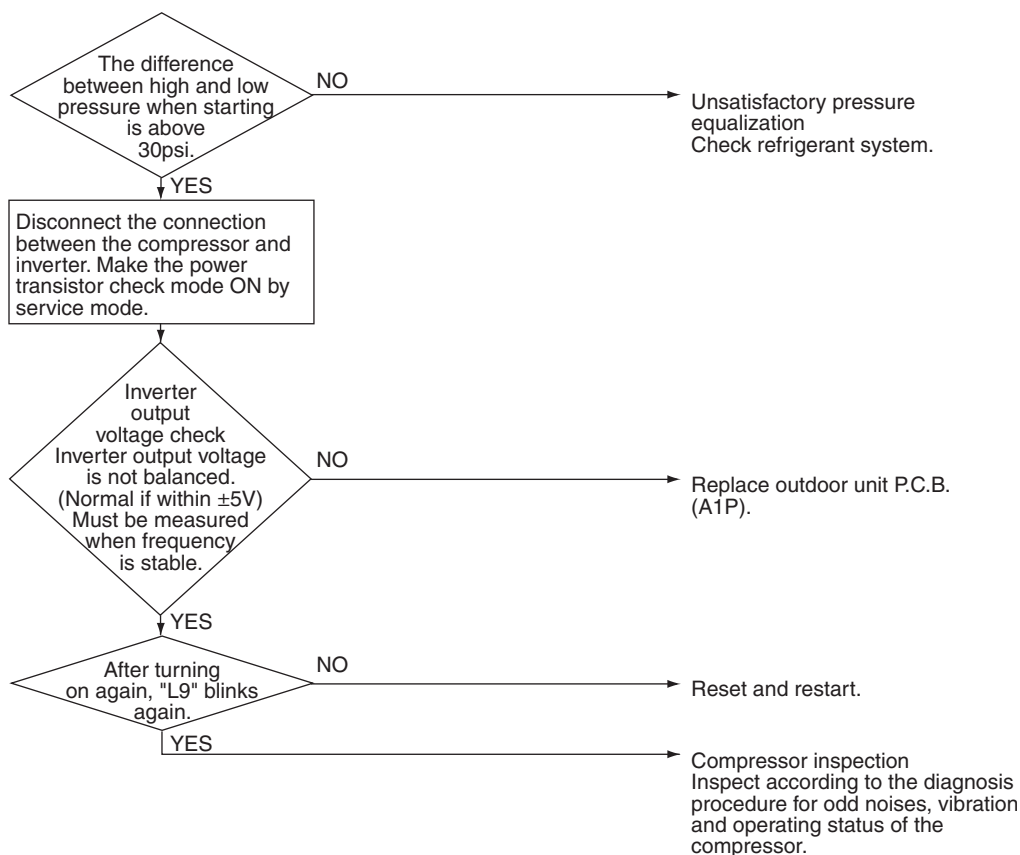
- Defect of compressor
- Pressure differential start
- Defect of outdoor unit P.C.B. (A1P)

Troubleshooting



Caution

Be sure to turn off the power switch before connecting or disconnecting the connector, or parts could be damaged.



3.33 “L L” Outdoor Unit: Malfunction of Transmission between Inverter and Control P.C.B.

Remote
Controller
Display

L L

Applicable
Models

RZQ18~30PVJU

Method of
Malfunction
Detection

Check the communication state between inverter P.C.B. and control P.C.B. by micro-computer.

Malfunction
Decision
Conditions

When the correct communication is not conducted in certain period.

Supposed
Causes

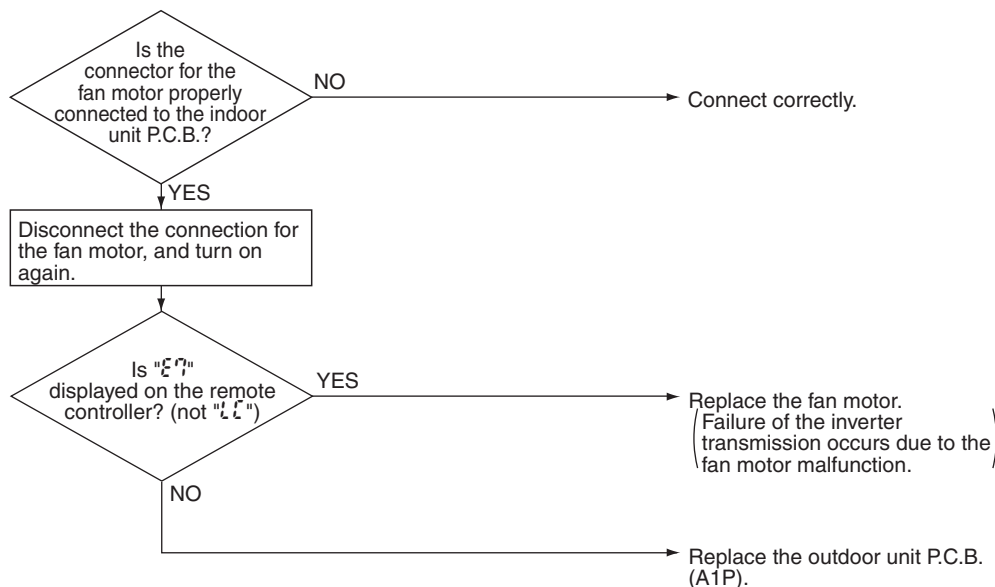
- Malfunction of connection between the inverter microcomputer and outdoor control microcomputer
- Defect of outdoor unit P.C.B.
- Defect of noise filter
- External factor (Noise etc.)

Troubleshooting



Caution

Be sure to turn off the power switch before connecting or disconnecting the connector, or parts could be damaged.



3.34 “P4” Outdoor Unit: Malfunction of Inverter Radiating Fin Temperature Rise Sensor

Remote
Controller
Display

P4

Applicable
Models

RZQ18~30PVJU

Method of
Malfunction
Detection

Resistance of radiation fin thermistor is detected when the compressor is not operating.

Malfunction
Decision
Conditions

When the resistance value of thermistor becomes a value equivalent to open or short circuited status.

★ Malfunction is not decided while the unit operation is continued.
“P4” will be displayed by pressing the inspection button.

Supposed
Causes

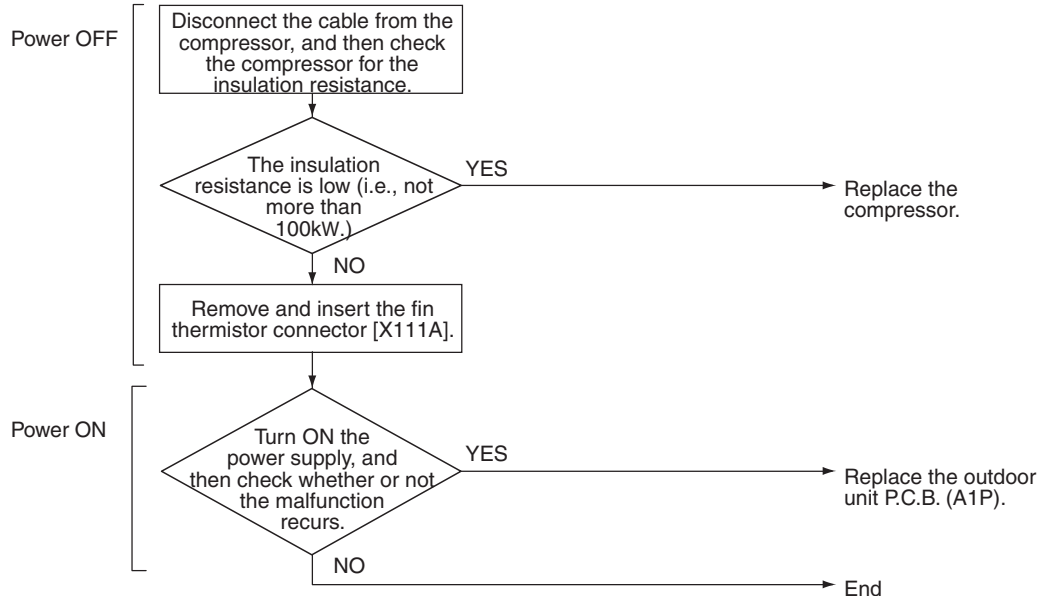
- Defect of radiator fin temperature sensor
- Defect of outdoor unit P.C.B. (A1P)

Troubleshooting



Caution

Be sure to turn off the power switch before connecting or disconnecting the connector, or parts could be damaged.



3.35 “U0” Outdoor Unit: Low Pressure Drop Due to Refrigerant Shortage or Electronic Expansion Valve Failure

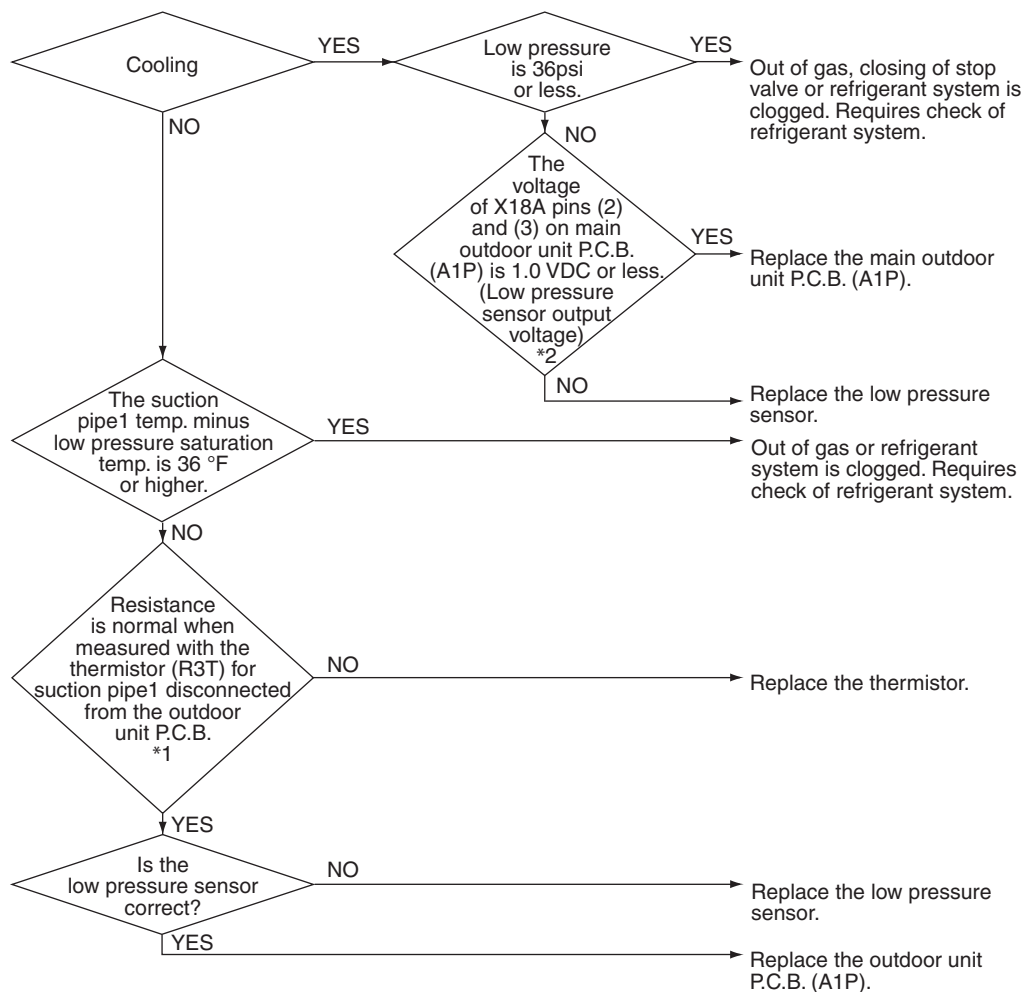
Remote Controller Display	U0
Applicable Models	RZQ18~30PVJU
Method of Malfunction Detection	Short of gas malfunction is detected by discharge pipe temperature thermistor and low pressure saturation temperature.
Malfunction Decision Conditions	Microcomputer judge and detect if the system is short of refrigerant. ★Malfunction is not decided while the unit operation is continued.
Supposed Causes	■ Out of gas or refrigerant system clogging (incorrect piping) ■ Defect of pressure sensor ■ Defect of outdoor unit P.C.B. (A1P) ■ Defect of thermistor R3T

Troubleshooting

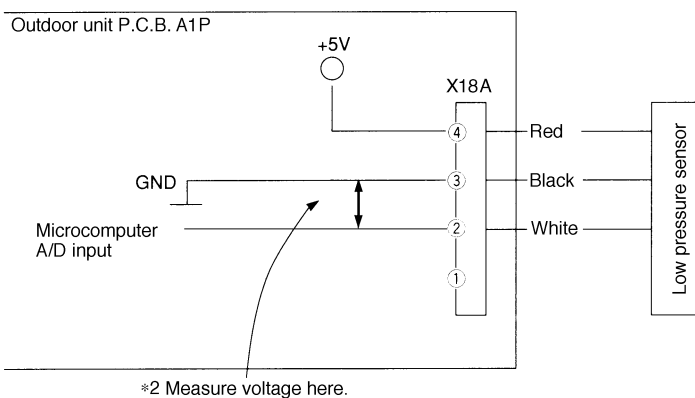


Caution

Be sure to turn off the power switch before connecting or disconnecting the connector, or parts could be damaged.



*2: Voltage measurement point



*1: Refer to **Thermistor Resistance / Temperature Characteristics** table on P.166.

*2: Refer to **Pressure Sensor, Pressure / Voltage Characteristics** table on P.168.

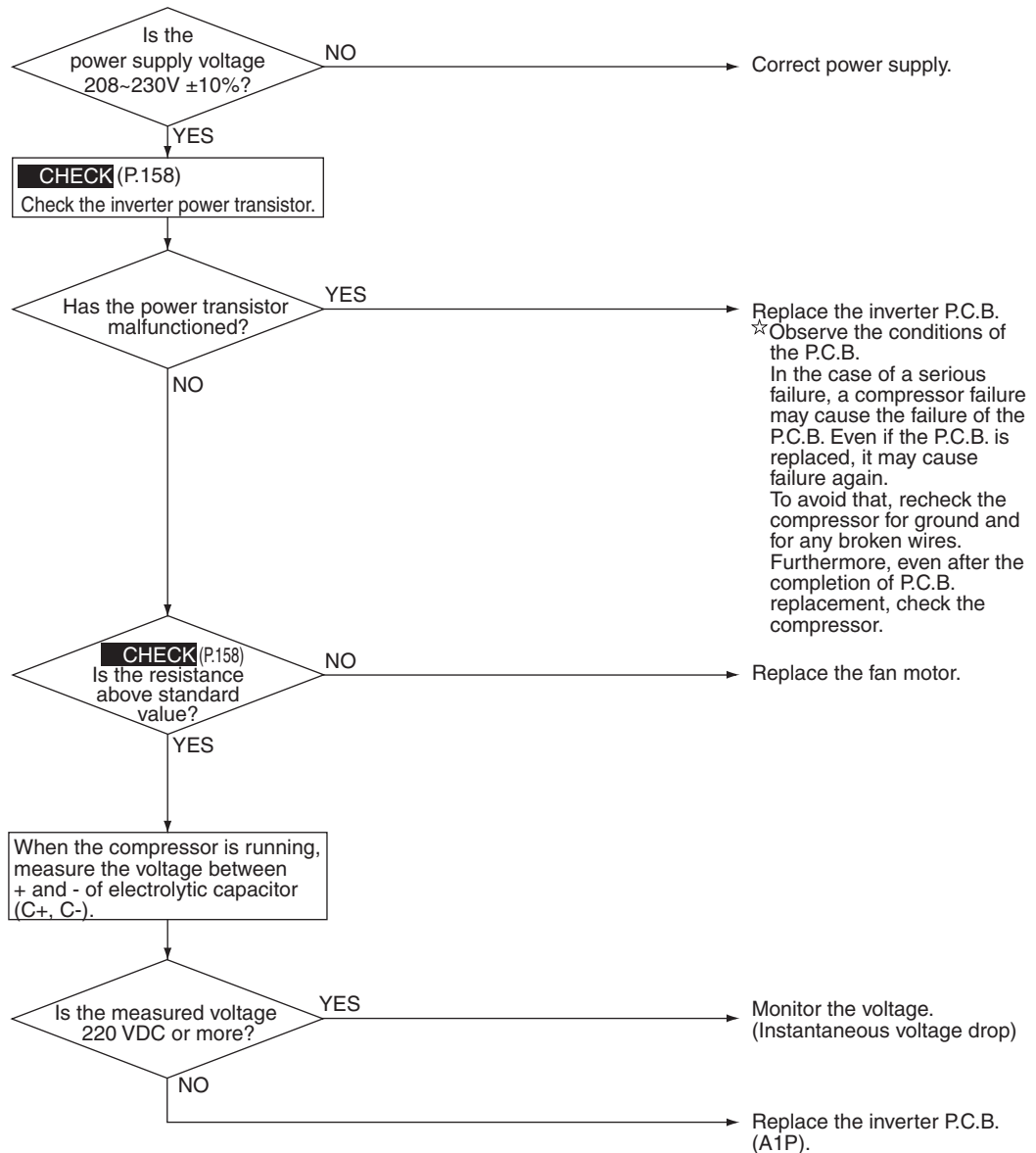
3.36 “U2” Power Supply Insufficient or Instantaneous Failure

Remote Controller Display	U2
Applicable Models	RZQ18~30PVJU
Method of Malfunction Detection	Detection of voltage of main circuit capacitor built in the inverter and power supply voltage.
Malfunction Decision Conditions	When the abnormal voltage of main circuit capacitor built in the inverter and abnormal power supply voltage are detected.
Supposed Causes	■ Power supply insufficient ■ Instantaneous power failure ■ Defect of outdoor unit fan motor ■ Defect of outdoor control P.C.B. (A1P)

Troubleshooting


Caution

Be sure to turn off the power switch before connecting or disconnecting the connector, or parts could be damaged.



3.37 “U3” Check Operation not Executed

Remote
Controller
Display

U3

Applicable
Models

RZQ18~30PVJU

Method of
Malfunction
Detection

Check operation is executed or not

Malfunction
Decision
Conditions

Malfunction is decided when the unit starts operation without check operation.

Supposed
Causes

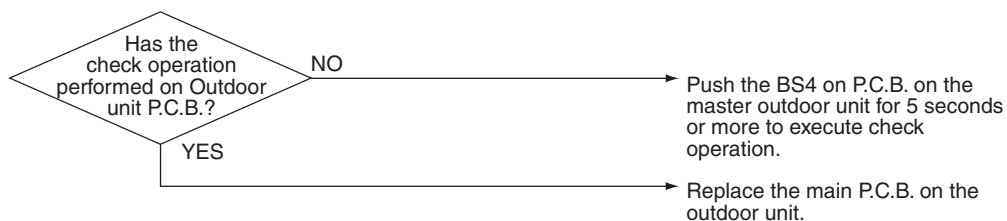
- Check operation is not executed.

Troubleshooting



Caution

Be sure to turn off the power switch before connecting or disconnecting the connector, or parts could be damaged.



3.38 “U4” Malfunction of Transmission between Indoor Units and Outdoor Units

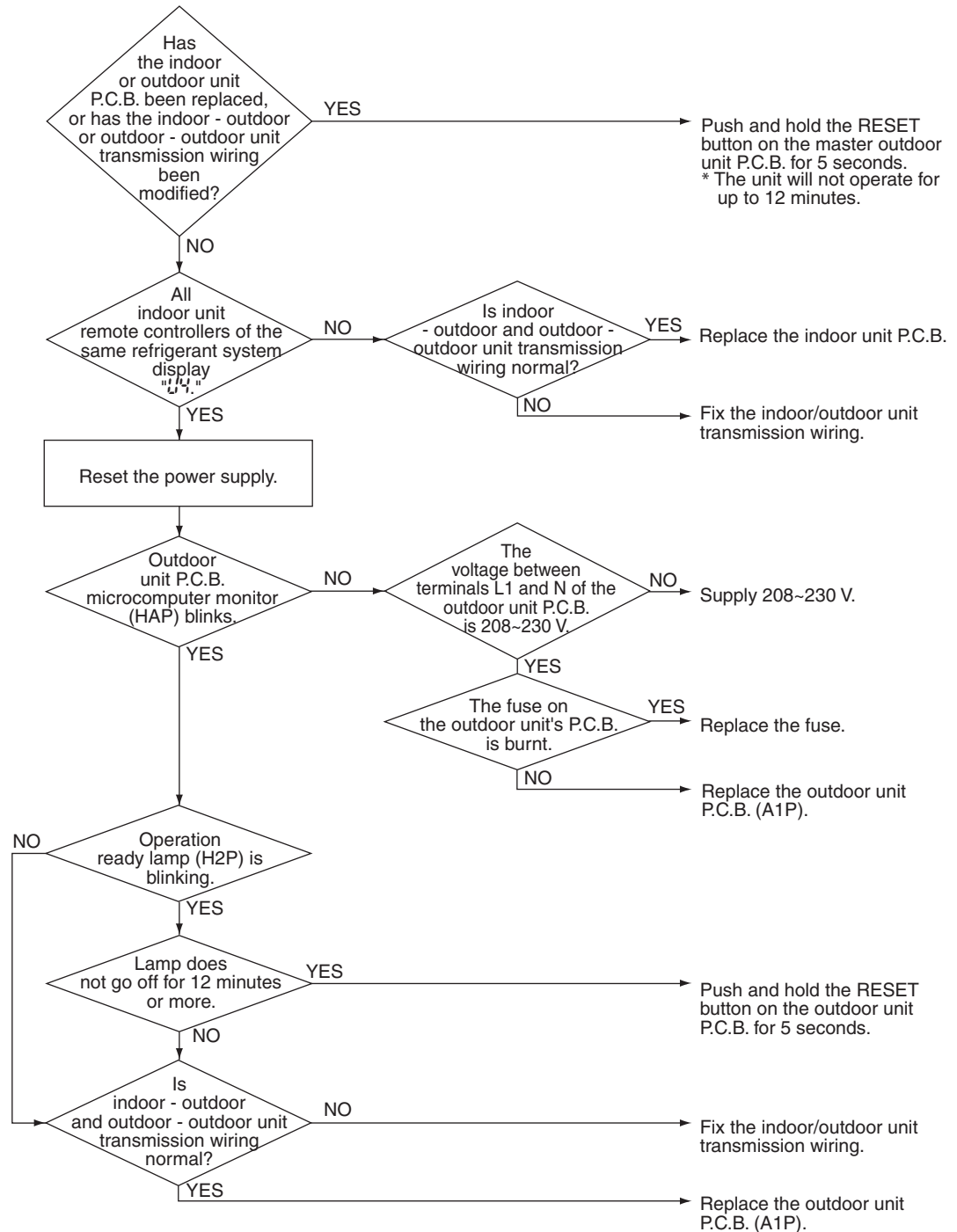
Remote Controller Display	U4
Applicable Models	All indoor unit models RZQ18~30PVJU
Method of Malfunction Detection	Microcomputer checks if transmission between indoor and outdoor units is normal.
Malfunction Decision Conditions	When transmission is not carried out normally for a certain amount of time.
Supposed Causes	■ Indoor to outdoor, outdoor to outdoor transmission wiring F1, F2 disconnection, short circuit or wrong wiring ■ Outdoor unit power supply is OFF ■ System address doesn't match ■ Defect of outdoor unit P.C.B. ■ Defect of indoor unit P.C.B.

Troubleshooting



Caution

Be sure to turn off the power switch before connecting or disconnecting the connector, or parts could be damaged.



3.39 “U5” Malfunction of Transmission between Remote Controller and Indoor Unit

Remote
Controller
Display

U5

Applicable
Models

All indoor unit models

Method of
Malfunction
Detection

In case of controlling with 2-remote controller, check the system using microcomputer is signal transmission between indoor unit and remote controller (main and sub) is normal.

Malfunction
Decision
Conditions

Normal transmission does not continue for specified period.

Supposed
Causes

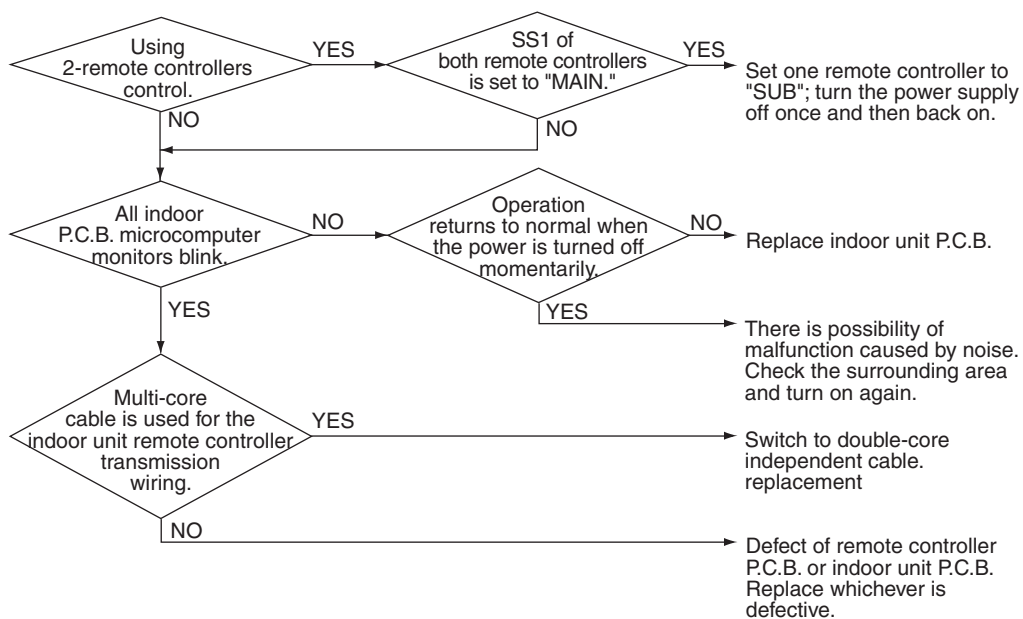
- Malfunction of indoor unit remote controller transmission
- Connection of two main remote controllers (when using 2 remote controllers)
- Defect of indoor unit P.C.B.
- Defect of remote controller P.C.B.
- Malfunction of transmission caused by noise

Troubleshooting



Caution

Be sure to turn off the power switch before connecting or disconnecting the connector, or parts could be damaged.



3.40 “08” Malfunction of Transmission between Main and Sub Remote Controllers

Remote
Controller
Display

08

Applicable
Models

All indoor unit models

Method of
Malfunction
Detection

In case of controlling with 2-remote controller, check the system using the microcomputer if signal transmission between indoor unit and remote controller (main and sub) is normal.

Malfunction
Decision
Conditions

Normal transmission does not continue for specified period.

Supposed
Causes

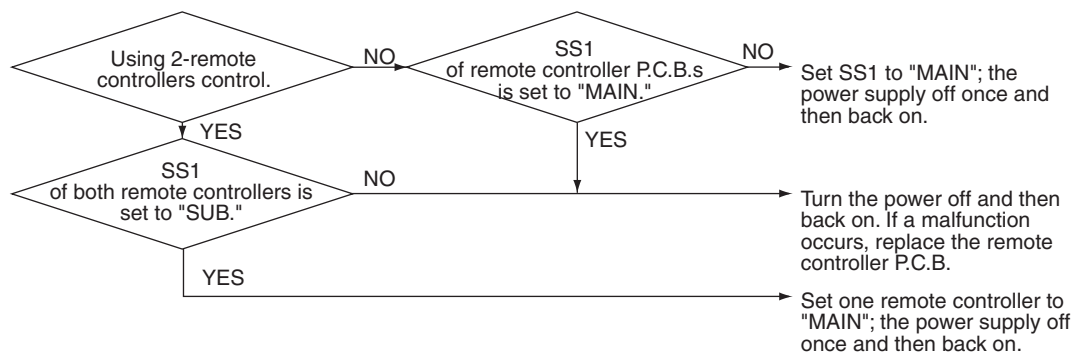
- Malfunction of transmission between main and sub remote controller
- Connection between sub-remote controllers
- Defect of remote controller P.C.B.

Troubleshooting



Caution

Be sure to turn off the power switch before connecting or disconnecting the connector, or parts could be damaged.



3.41 “UE” Malfunction of Transmission between Centralized Remote Controller and Indoor Unit

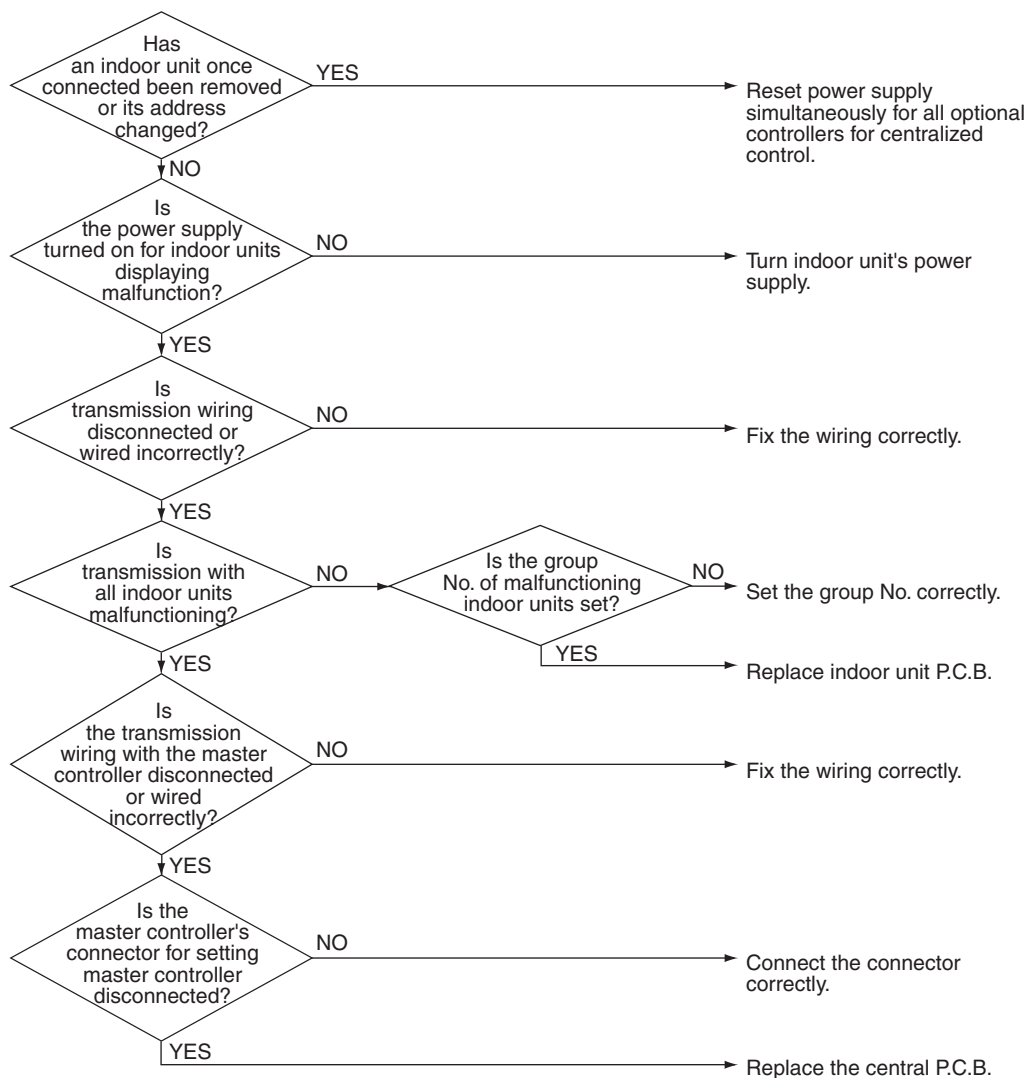
Remote Controller Display	UE
Applicable Models	All indoor unit models Centralized controller
Method of Malfunction Detection	Microcomputer checks if transmission between indoor unit and centralized remote controller is normal.
Malfunction Decision Conditions	When transmission is not carried out normally for a certain amount of time
Supposed Causes	■ Malfunction of transmission between optional controllers for centralized control and indoor unit ■ Connector for setting master controller is disconnected. ■ Failure of P.C.B. for centralized remote controller ■ Defect of indoor unit P.C.B.

Troubleshooting



Caution

Be sure to turn off the power switch before connecting or disconnecting the connector, or parts could be damaged.



3.42 “UE” System is not Set yet

Remote
Controller
Display

UE

Applicable
Models

All models of indoor units
RZQ18~30PVJU

Method of
Malfunction
Detection

On check operation, the number of indoor units in terms of transmission is not corresponding to that of indoor units that have made changes in temperature.

Malfunction
Decision
Conditions

The malfunction is determined as soon as the abnormality aforementioned is detected through checking the system for any erroneous connection of units on the check operation.

Supposed
Causes

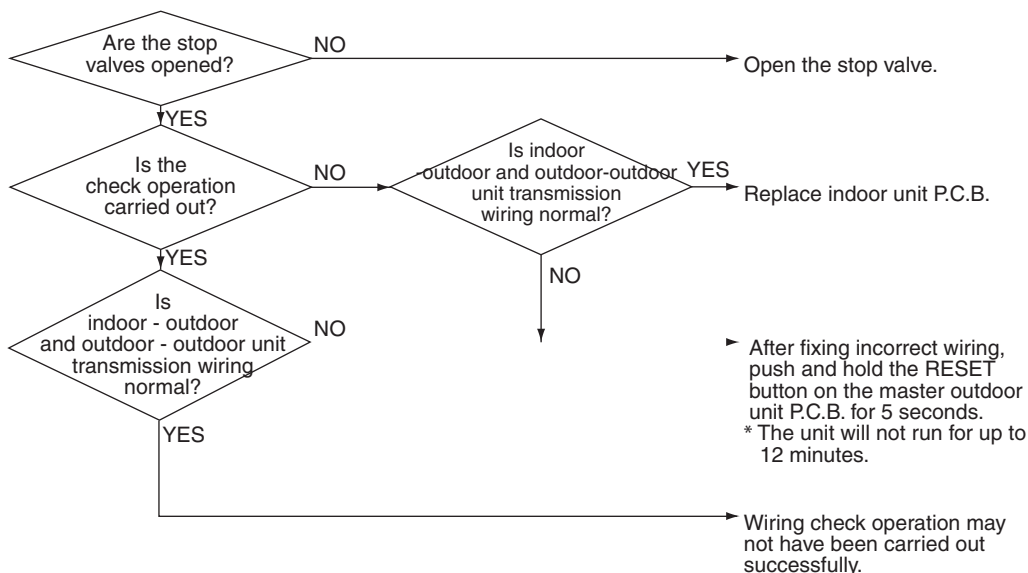
- Improper connection of transmission wiring between indoor-outdoor units and outdoor-outdoor units
- Failure to execute check operation
- Defect of indoor unit P.C.B.
- Stop valve is left in closed

Troubleshooting



Caution

Be sure to turn off the power switch before connecting or disconnecting the connector, or parts could be damaged.



Note:

Wiring check operation may not be successful if carried out after the outdoor unit has been off for more than 12 hours, or if it is not carried out after running all connected indoor units in the fan mode for at least an hour.

3.43 “” Malfunction of System, Refrigerant System Address Undefined

Remote
Controller
Display



Applicable
Models

All indoor unit models
RZQ18~30PVJU

Method of
Malfunction
Detection

Malfunction
Decision
Conditions

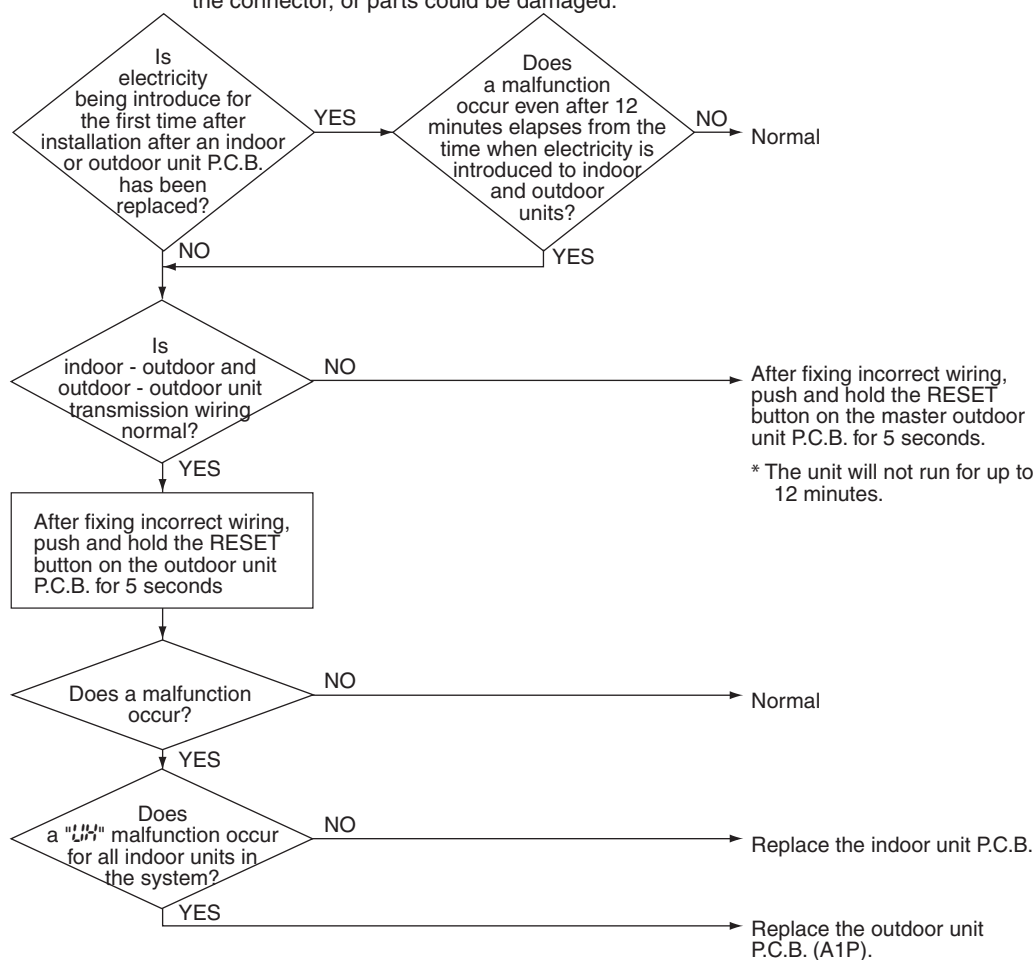
Supposed
Causes

- Improper connection of transmission wiring between outdoor unit and outdoor unit outside control adaptor
- Defect of indoor unit P.C.B.
- Defect of outdoor unit P.C.B. (A1P)

Troubleshooting



Caution Be sure to turn off the power switch before connecting or disconnecting the connector, or parts could be damaged.



4. Troubleshooting by Indication on the Centralized Remote Controller

4.1 “UE” Malfunction of Transmission between Centralized Remote Controller and Indoor Unit

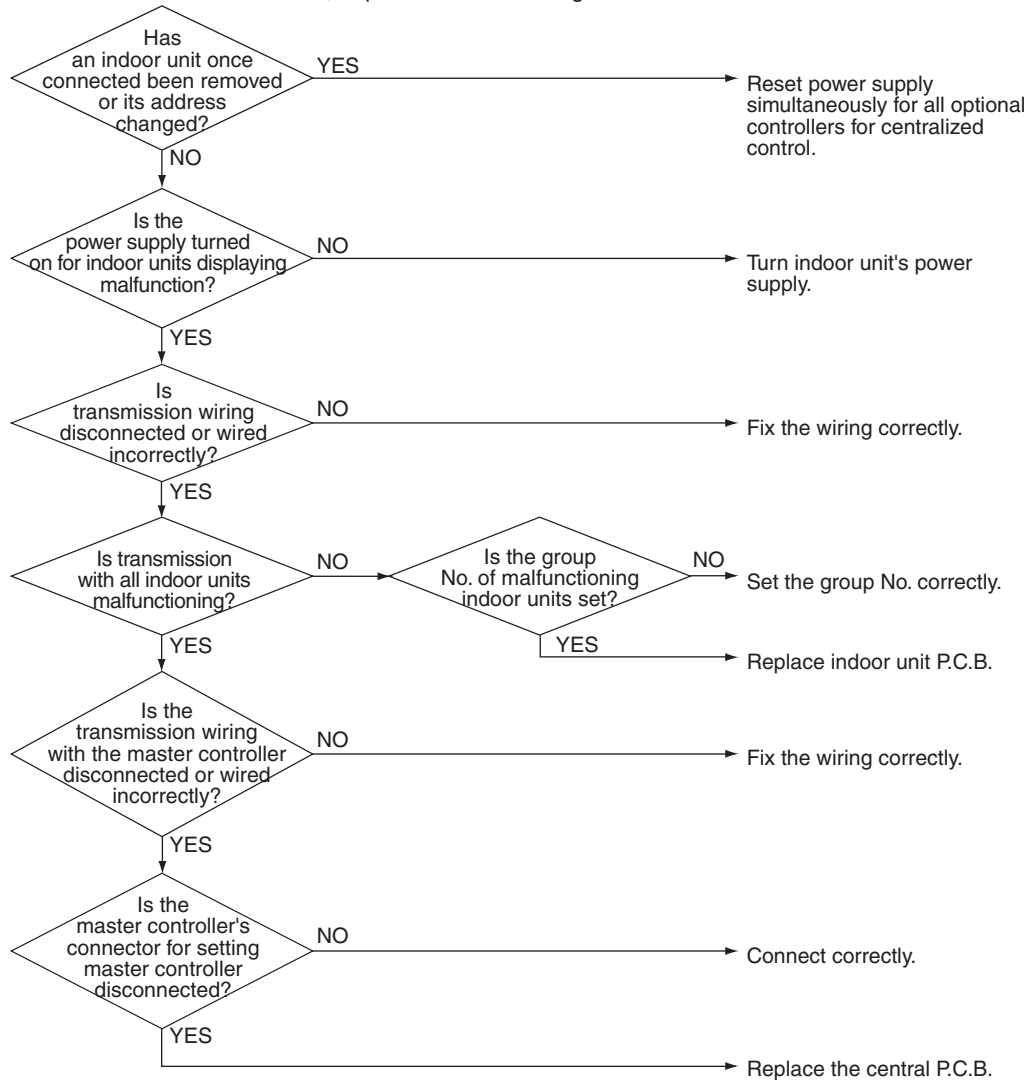
Remote Controller Display	UE
Applicable Models	All indoor unit models Centralized Remote Controller
Method of Malfunction Detection	Microcomputer checks if transmission between indoor unit and centralized remote controller is normal.
Malfunction Decision Conditions	When transmission is not carried out normally for a certain amount of time
Supposed Causes	■ Malfunction of transmission between optional controllers for centralized control and indoor unit ■ Connector for setting master controller is disconnected. ■ Failure of P.C.B. for centralized remote controller ■ Defect of indoor unit P.C.B.

Troubleshooting



Caution

Be sure to turn off the power switch before connecting or disconnecting the connector, or parts could be damaged.



4.2 “M I” P.C.B. Defect

Remote
Controller
Display

M I

Applicable
Models

Centralized remote controller

Method of
Malfunction
Detection

Malfunction
Decision
Conditions

Supposed
Causes

- Defect of centralized remote controller P.C.B.

Troubleshooting

Replace the centralized remote controller P.C.B.

4.3 “M8” Malfunction of Transmission between Optional Controllers for Centralized Control

Remote
Controller
Display

M8

Applicable
Models

Centralized remote controller

Method of
Malfunction
Detection

Malfunction
Decision
Conditions

Supposed
Causes

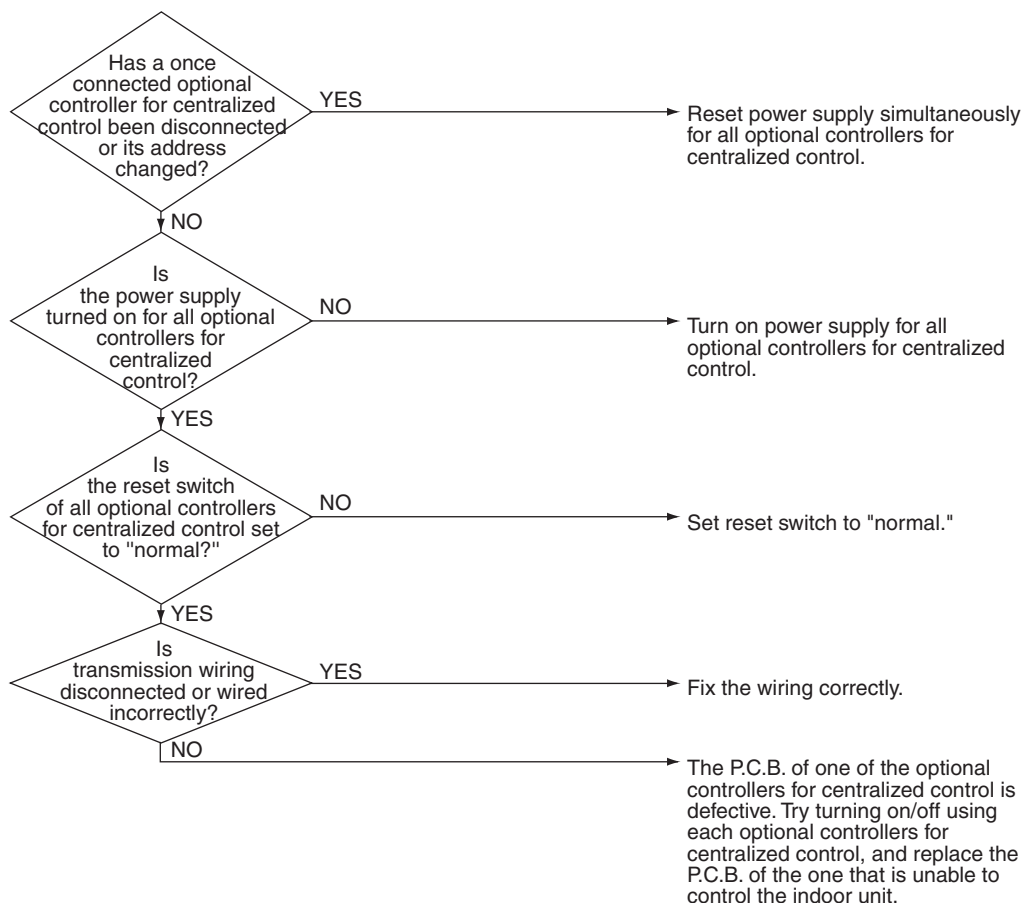
- Malfunction of transmission between optional controllers for centralized control
- Defect of P.C.B. of optional controllers for centralized control

Troubleshooting



Caution

Be sure to turn off the power switch before connecting or disconnecting the connector, or parts could be damaged.



4.4 “MR” Improper Combination of Optional Controllers for Centralized Control

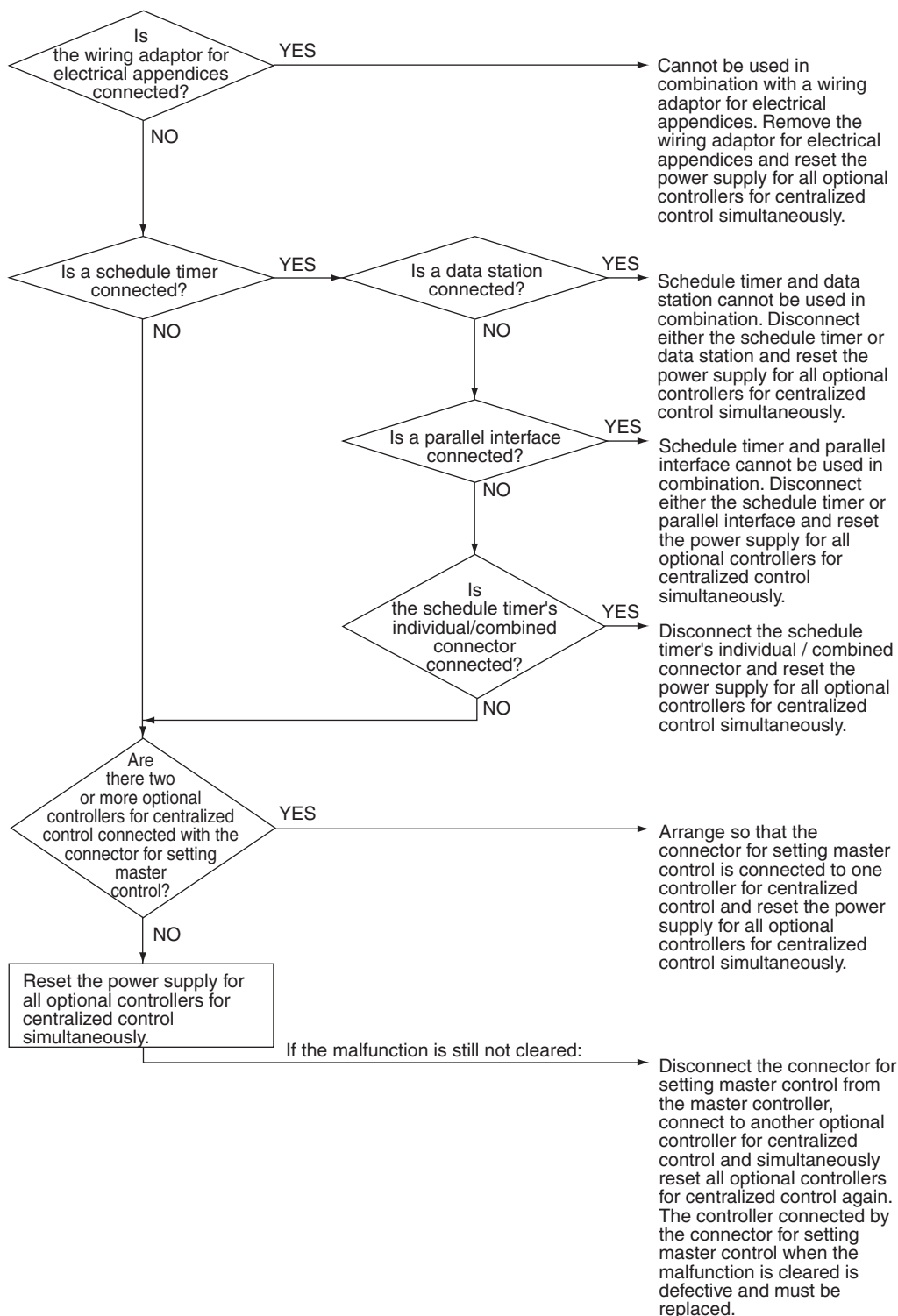
Remote Controller Display	MR
Applicable Models	Centralized remote controller
Method of Malfunction Detection	
Malfunction Decision Conditions	
Supposed Causes	■ Improper combination of optional controllers for centralized control ■ More than one master controller is connected ■ Defect of P.C.B. of optional controller for centralized control

Troubleshooting



Caution

Be sure to turn off the power switch before connecting or disconnecting the connector, or parts could be damaged.



4.5 “MC” Address Duplication, Improper Setting

Remote
Controller
Display

MC

Applicable
Models

Centralized remote controller

Method of
Malfunction
Detection

Malfunction
Decision
Conditions

Supposed
Causes

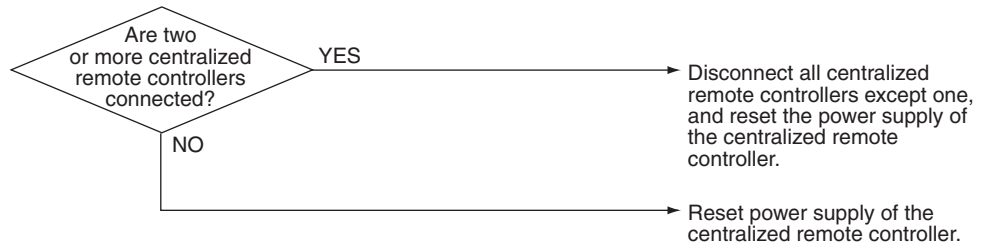
- Address duplication of centralized remote controller

Troubleshooting



Caution

Be sure to turn off the power switch before connecting or disconnecting the connector, or parts could be damaged.



5. Troubleshooting by Indication on the Unified ON/OFF Controller

5.1 Operation Lamp Blinks

**Remote
Controller
Display**

Operation lamp blinks

**Applicable
Models**

All models of indoor units
Unified ON/OFF controller

**Method of
Malfunction
Detection****Malfunction
Decision
Conditions****Supposed
Causes**

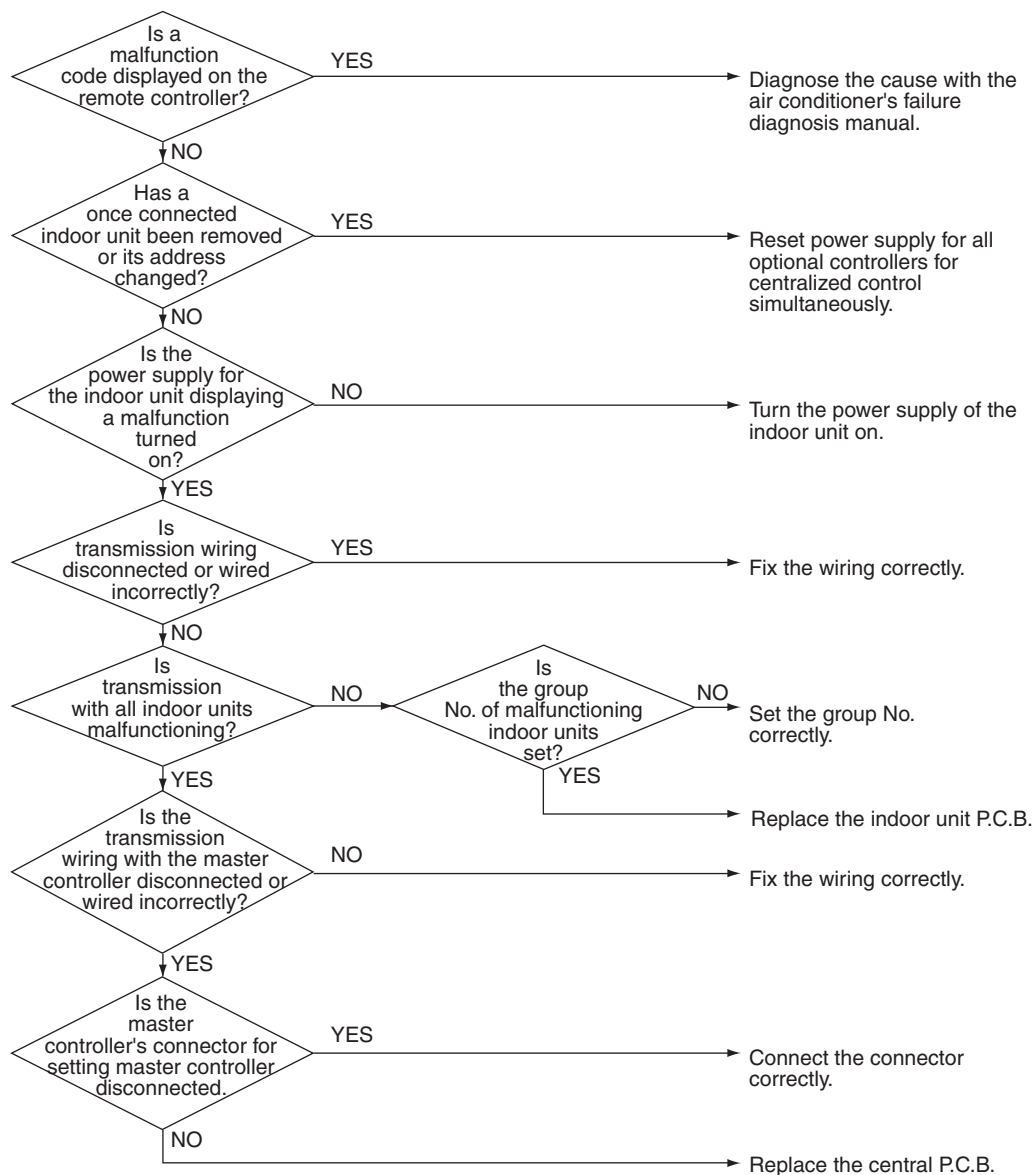
-
- Malfunction of transmission between optional controller and indoor unit
 - Connector for setting master controller is disconnected
 - Defect of unified ON/OFF controller
 - Defect of indoor unit P.C.B.
 - Malfunction of air conditioner
-

Troubleshooting



Caution

Be sure to turn off the power switch before connecting or disconnecting the connector, or parts could be damaged.



5.2 Display “Under Host Computer Integrate Control” Blinks (Repeats Single Blink)

**Remote
Controller
Display**

“under host computer integrated control” (Repeats single blink)

**Applicable
Models**

Unified ON/OFF controller
Centralized controller, Schedule timer

**Method of
Malfunction
Detection****Malfunction
Decision
Conditions****Supposed
Causes**

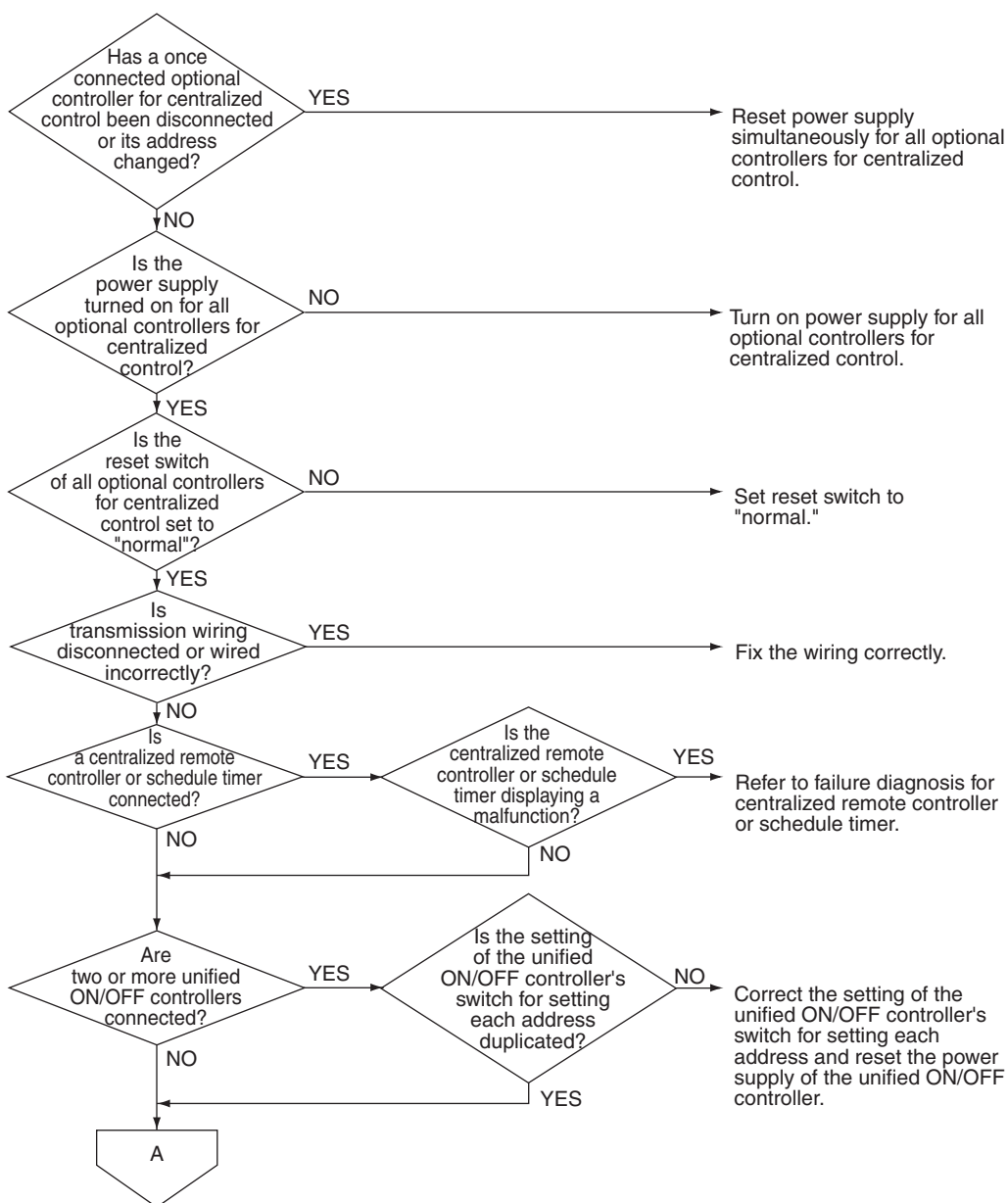
-
- Address duplication of centralized remote controller
 - Improper combination of optional controllers for centralized control
 - Connection of more than one master controller
 - Malfunction of transmission between optional controllers for centralized control
 - Defect of P.C.B. of optional controllers for centralized control

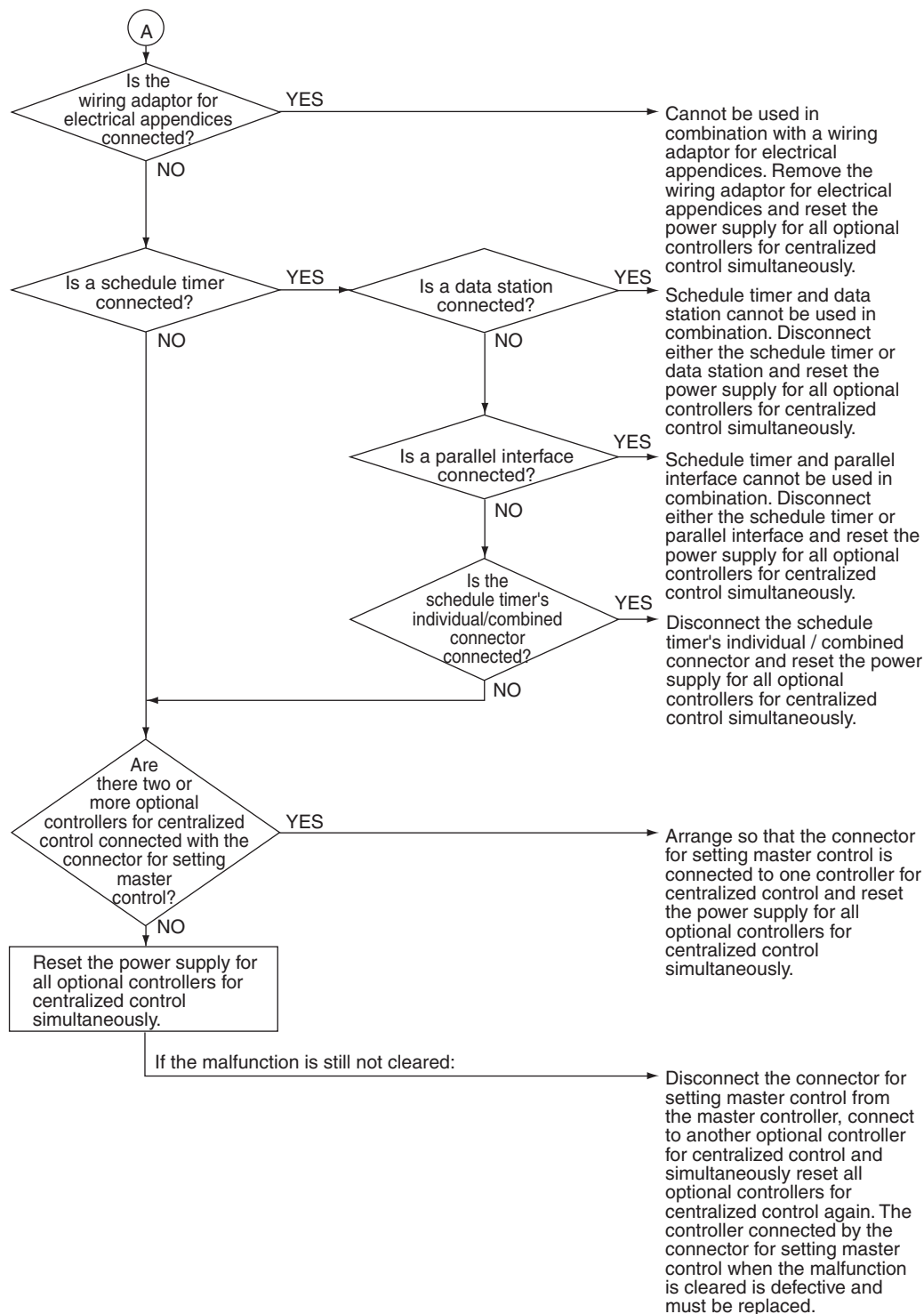
Troubleshooting



Caution

Be sure to turn off the power switch before connecting or disconnecting the connector, or parts could be damaged.





5.3 Display “Under Host Computer Integrate Control” Blinks (Repeats Double Blink)

Remote Controller Display

“Under host computer integrated control” (Repeats double blink)

Applicable Models

Unified ON/OFF controller

Method of Malfunction Detection

Malfunction Decision Conditions

Supposed Causes

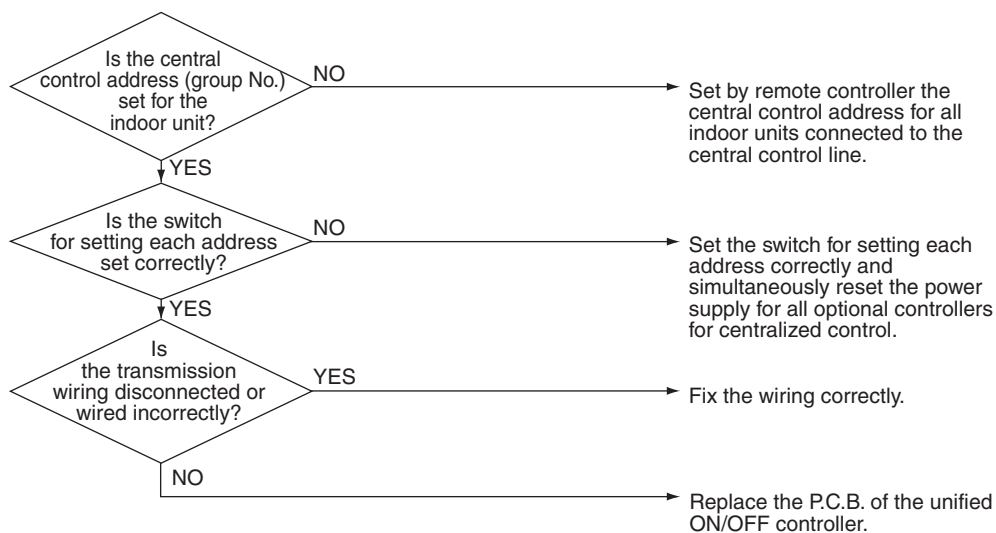
- Central control address (group No.) is not set for indoor unit.
- Improper address setting
- Improper wiring of transmission wiring

Troubleshooting



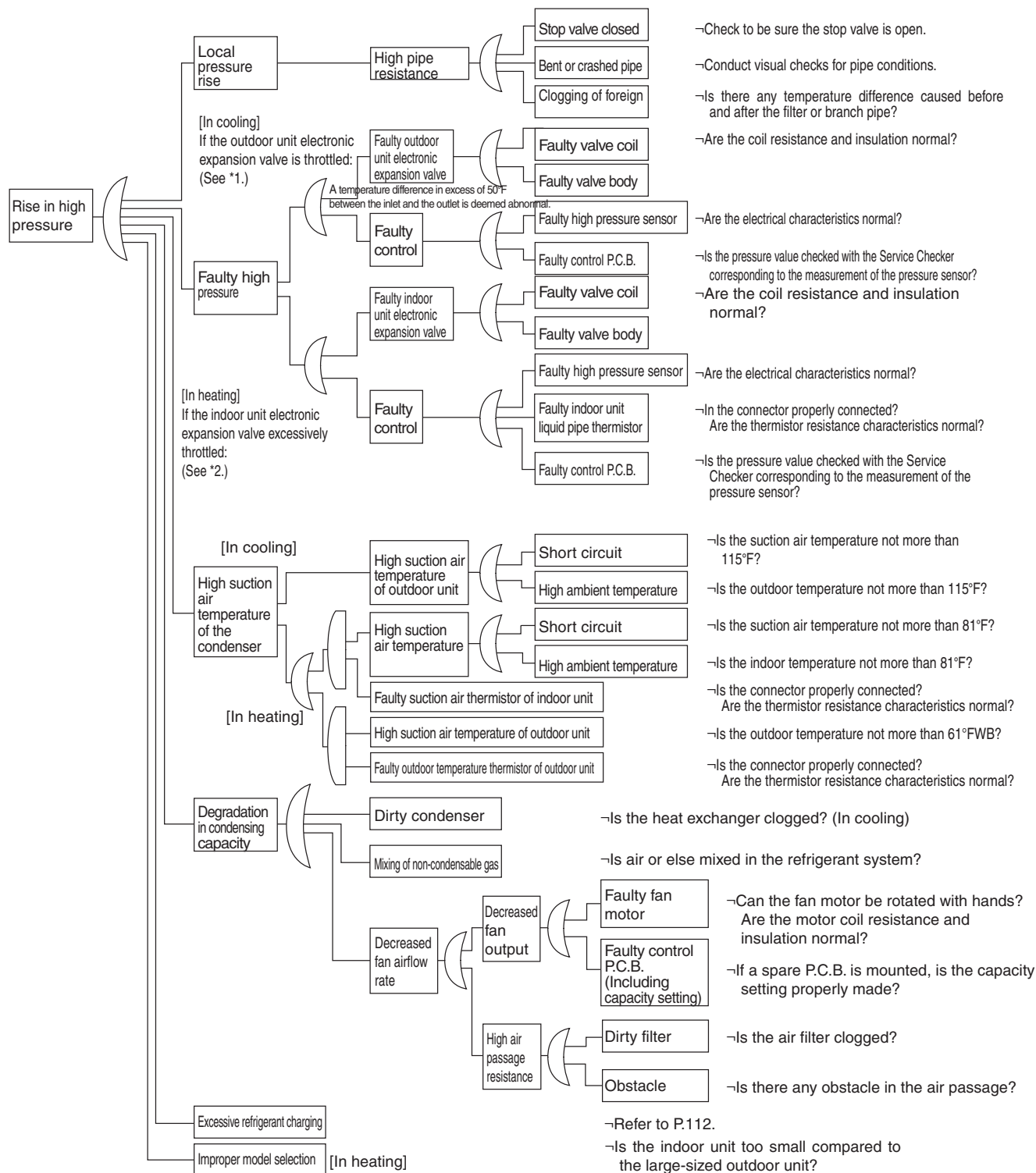
Caution

Be sure to turn off the power switch before connecting or disconnecting the connector, or parts could be damaged.



CHECK 1 Check for causes of rise in high pressure

Referring to the Fault Tree Analysis (FTA) shown below, probe the faulty points.

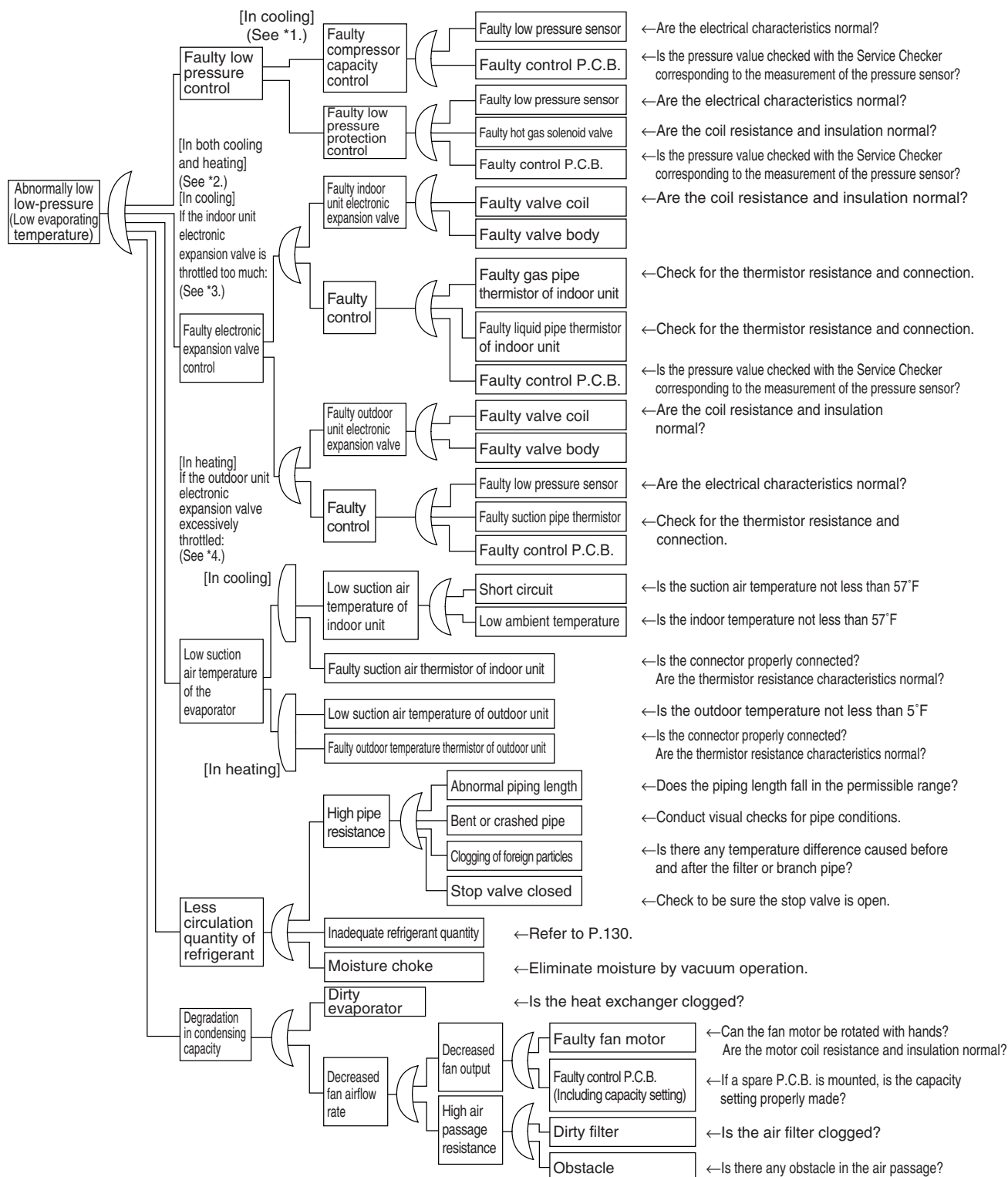


*1: In cooling, it is normal if the outdoor unit electronic expansion valve (EV1) is fully open.

*2: In heating, the indoor unit electronic expansion valve is used for "subcooled degree control".

CHECK 2 Check for causes of drop in low pressure

Referring to the Fault Tree Analysis (FTA) shown below, probe the faulty points.



*1: For details of the compressor capacity control while in cooling, refer to "Compressor PI Control" on P.18.

*2: The "low pressure protection control" includes low pressure protection control and hot gas bypass control. For details, refer to P.30.

*3: In cooling, the indoor unit electronic expansion valve is used for "superheated degree control". (For details, refer to P.19.)

*4: In heating, the outdoor unit electronic expansion valve (EV1) is used for "superheated degree control of outdoor unit heat exchanger". (For details, refer to P.19.)

CHECK 3 Check for Fan Motor Connector

- (1) Turn the power supply off.
- (2) With the fan motor connector disconnected, measure the resistance between each pin, then make sure that the resistance is more than the value mentioned in the following table.

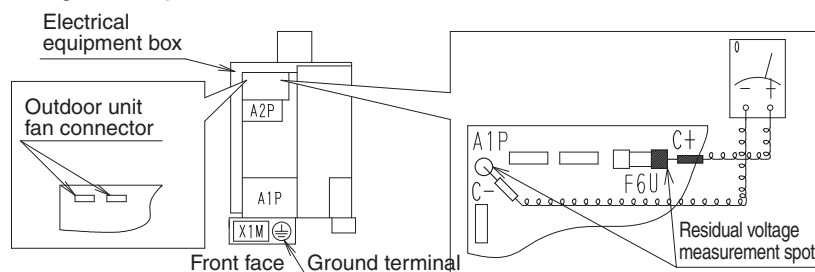


Measurement point	Judgement
1 - 4	1MΩ or more
2 - 4	100kΩ or more
3 - 4	100Ω or more
4 - 7	100kΩ or more

CHECK 4 Check for Power Transistor

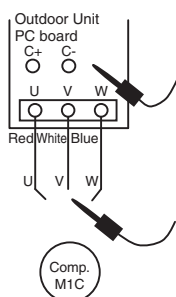
Judgment is made through cable check with an analog tester.

- (1) Do not touch the energized part (high voltage part) for at least 10 minutes after the power is turned OFF.
- (2) Be sure to touch the ground terminal with a hand to release static electricity from the body (to prevent the PC board from being damaged).
- (3) Also with a tester, take measurements at the following spots and confirm that residual electric charge of the power transistor is DC 50V or less.



- (4) After checking the residual electric charge, remove the connector of the outdoor unit fan motor. When the outdoor unit fan is rotated by strong headwind, remove the connector of the outdoor unit fan motor after confirming that the outdoor unit fan has stopped because electrical energy is stored in the capacitor and there may be a risk of electric shock.
- (5) Remove the wire connecting the power transistor and the compressor. Remove it from the compressor terminal side. During this work, be careful not to deform the Faston terminal at the end of the connecting wire.
- (6) Using an analog tester, measure resistance and fill in the blanks in the following table.
In case of unbalanced resistance for one of the three phases in each table (when the resistance value is equal to five times or more than the other resistance values), the power transistor is broken.

In normal cases, each phase shows a similar resistance value.



Tester		Resistance
(+)	(-)	Ω
C+	U	
C+	V	
C+	W	
U	C+	∞
V	C+	∞
W	C+	∞

Tester		Resistance
(+)	(-)	Ω
C-	U	∞
C-	V	∞
C-	W	∞
U	C-	
V	C-	
W	C-	

Part 8

Appendix

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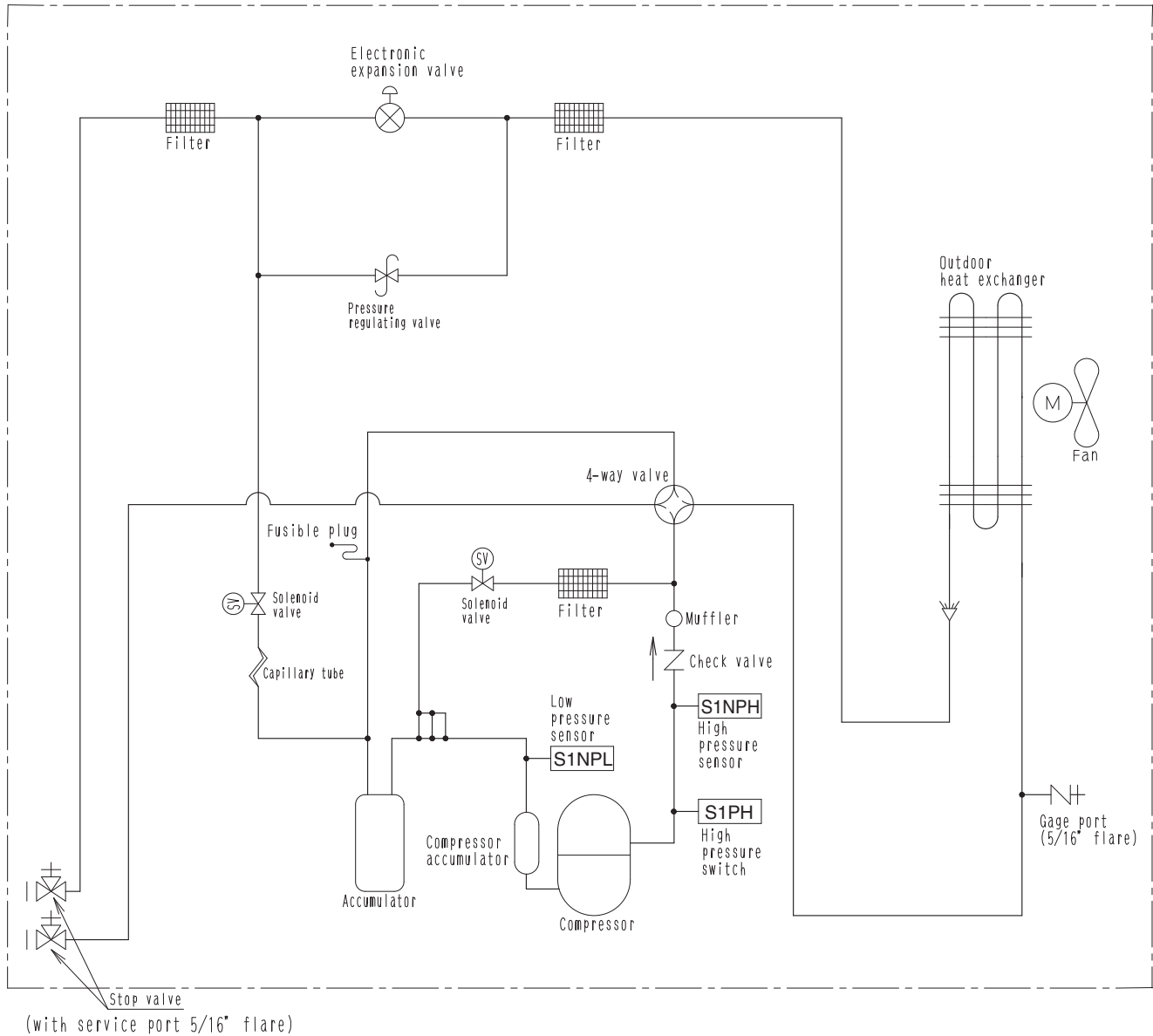
1. Piping Diagrams

1.1 Outdoor Unit

RZQ18PVJU

RZQ24PVJU

RZQ30PVJU



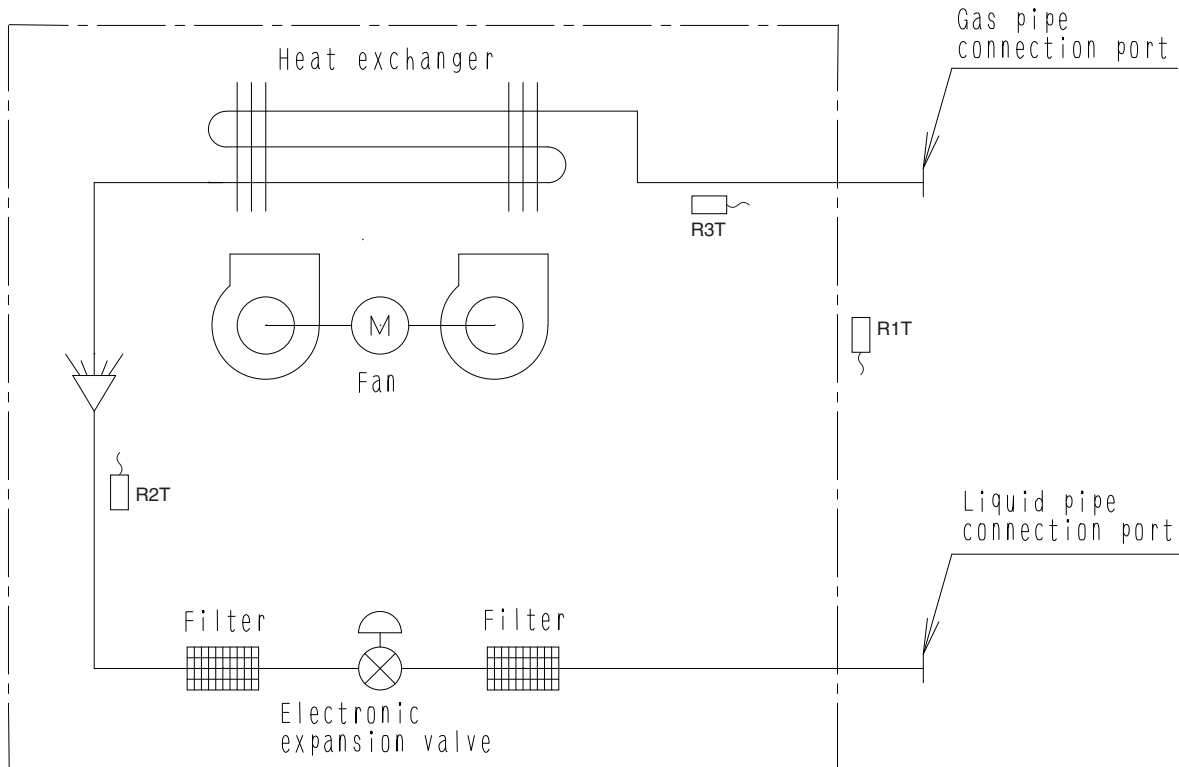
C : 3D062238B

1.2 Indoor Unit

FCQ18P / 24P / 30PVJU

FHQ18P / 24P / 30PVJU

FAQ18P / 24PVJU



C:4D024460D

R1T : Thermistor for suction air temperature

R2T : Thermistor for liquid line temperature

R3T : Thermistor for gas line temperature

(in)

Capacity	GAS	Liquid
18/24/30P	$\phi 5/8$	$\phi 3/8$

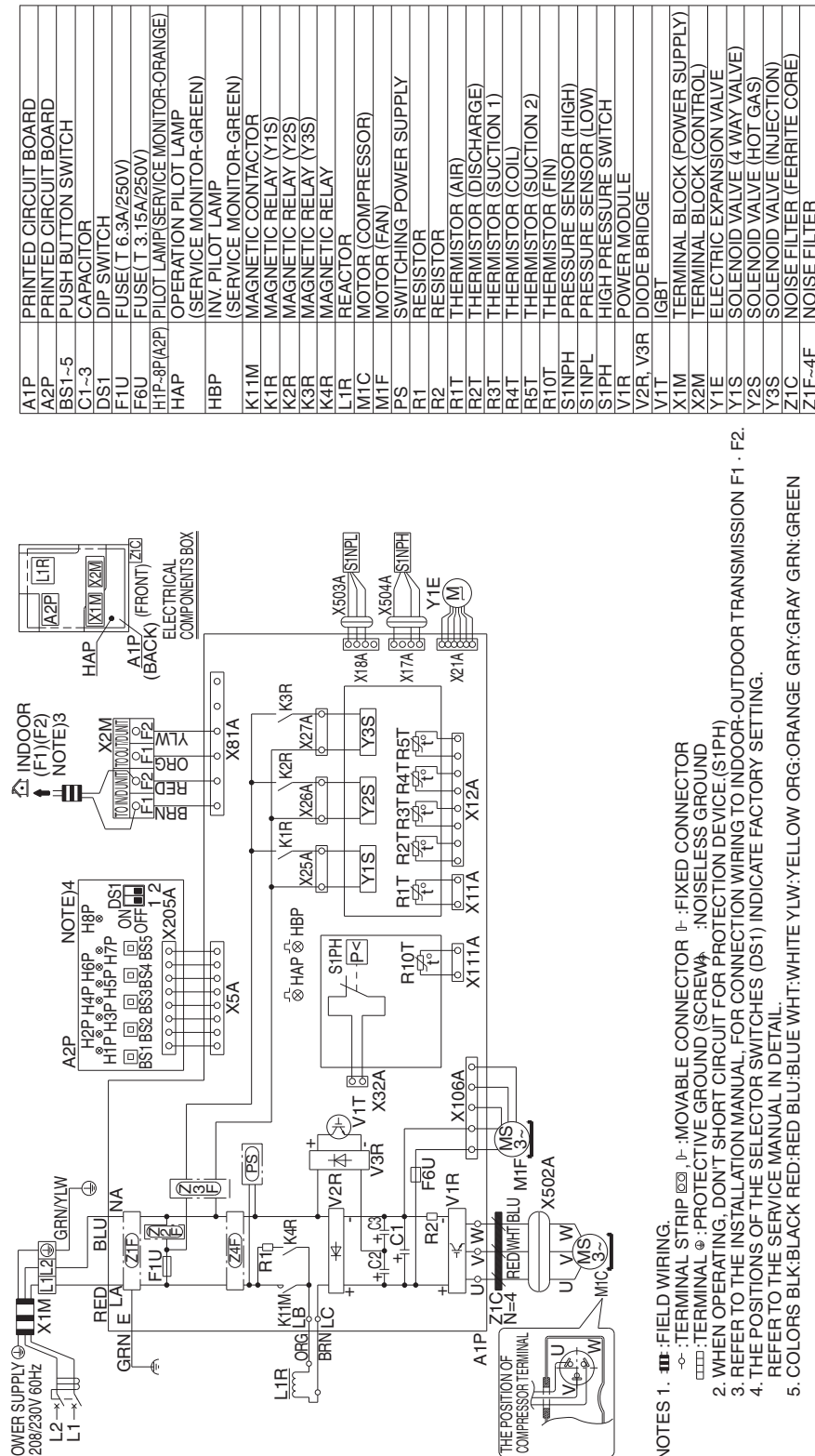
2. Wiring Diagrams for Reference

2.1 Outdoor Unit

RZQ18PVJU

RZQ24PVJU

RZQ30PVJU



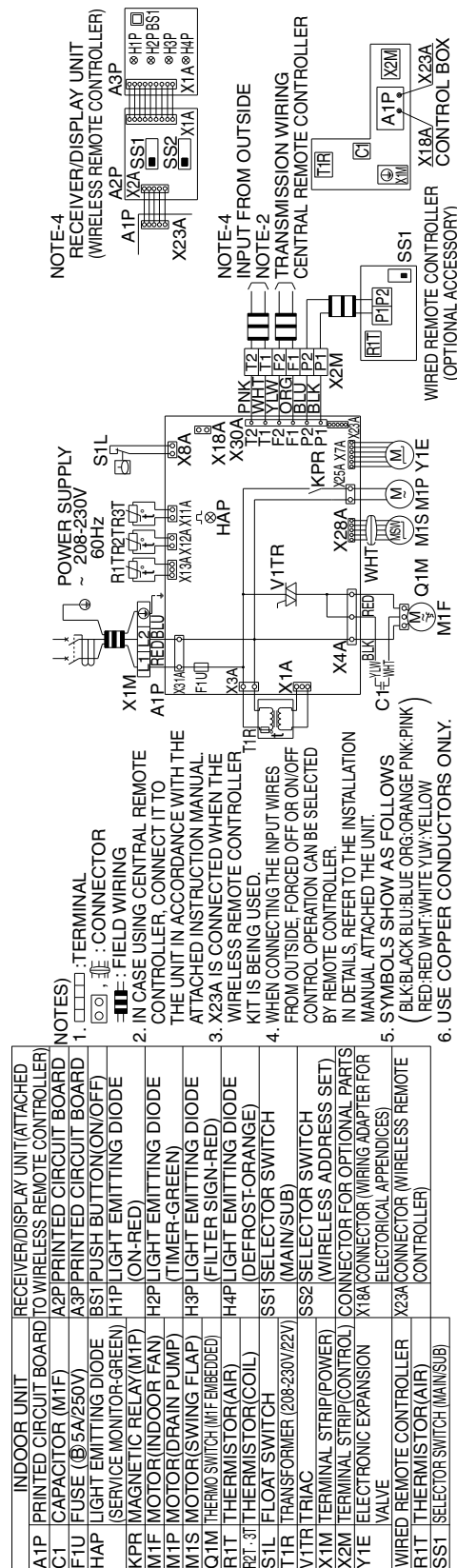
3D062307B

2.2 Indoor Unit

FCQ18PVJU

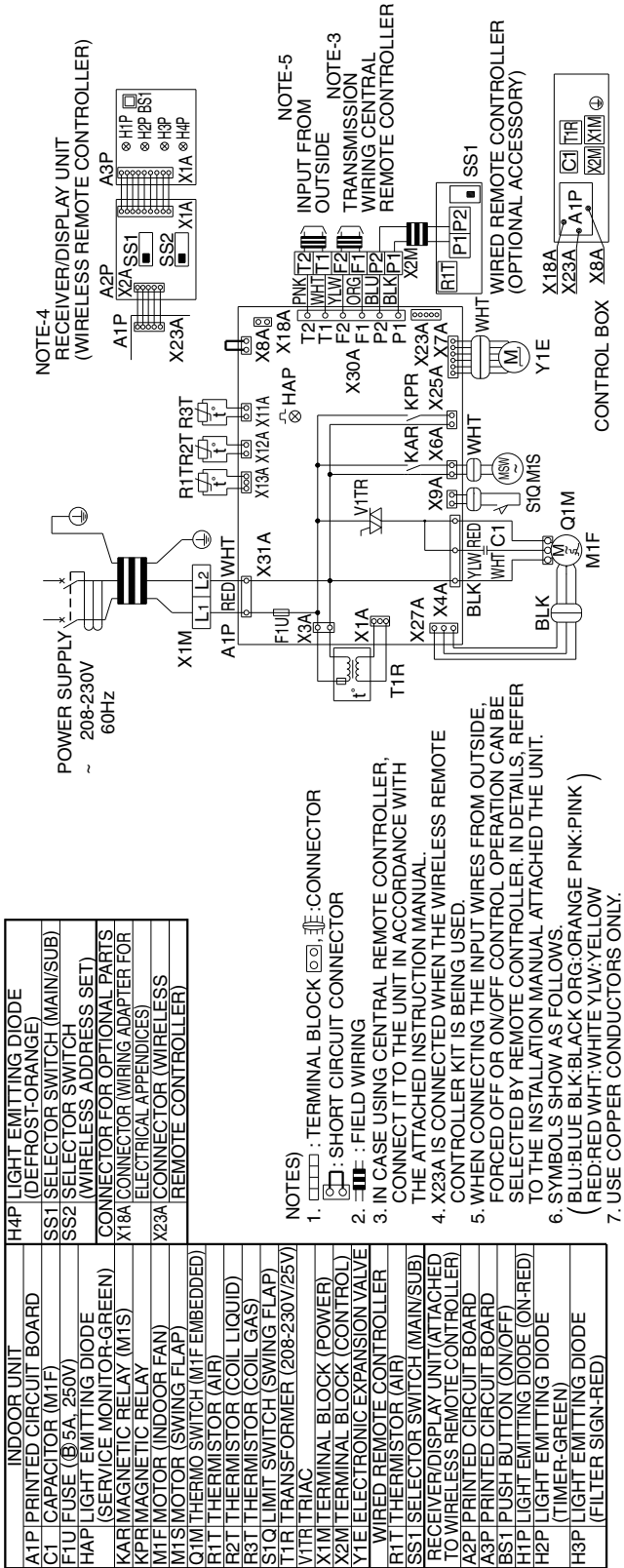
FCQ24PVJU

FCQ30PVJU



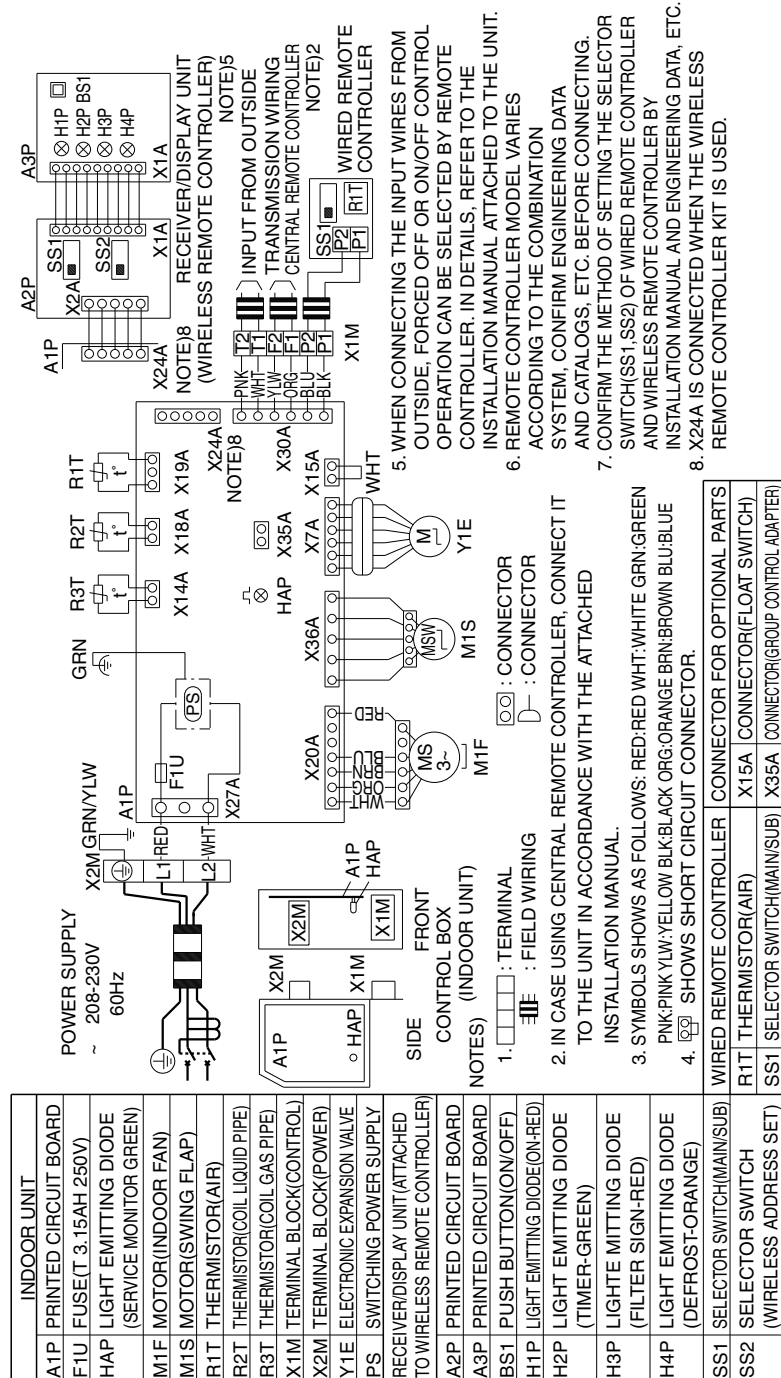
3D042620C

FHQ18PVJU
FHQ24PVJU
FHQ30PVJU



3D048116A

FAQ18PVJU
FAQ24PVJU



3D046039D

3. Thermistor Resistance / Temperature Characteristics

Indoor unit	For air suction	R1T
	For liquid pipe	R2T
	For gas pipe	R3T
Outdoor unit	For outdoor air	R1T
	For suction 1	R3T
	For Heat exchanger	R4T
	For Suction 2	R5T

T°F	T°C	kΩ
-4.0	-20	197.81
-2.2	-19	186.53
-0.4	-18	175.97
1.4	-17	166.07
3.2	-16	156.80
5.0	-15	148.10
6.8	-14	139.94
8.6	-13	132.28
10.4	-12	125.09
12.2	-11	118.34
14.0	-10	111.99
15.8	-9	106.03
17.6	-8	100.41
19.4	-7	95.14
21.2	-6	90.17
23.0	-5	85.49
24.8	-4	81.08
26.6	-3	76.93
28.4	-2	73.01
30.2	-1	69.32
32.0	0	65.84
33.8	1	62.54
35.6	2	59.43
37.4	3	56.49
39.2	4	53.71
41.0	5	51.09
42.8	6	48.61
44.6	7	46.26
46.4	8	44.05
48.2	9	41.95
50.0	10	39.96
51.8	11	38.08
53.6	12	36.30
55.4	13	34.62
57.2	14	33.02
59.0	15	31.50
60.8	16	30.06
62.6	17	28.70
64.4	18	27.41
66.2	19	26.18
68.0	20	25.01

T°F	T°C	kΩ
68.0	20	25.01
69.8	21	23.91
71.6	22	22.85
73.4	23	21.85
75.2	24	20.90
77.0	25	20.00
78.8	26	19.14
80.6	27	18.32
82.4	28	17.54
84.2	29	16.80
86.0	30	16.10
87.8	31	15.43
89.6	32	14.79
91.4	33	14.18
93.2	34	13.59
95.0	35	13.04
96.8	36	12.51
98.6	37	12.01
100.4	38	11.52
102.2	39	11.06
104.0	40	10.63
105.8	41	10.21
107.6	42	9.81
109.4	43	9.42
111.2	44	9.06
113.0	45	8.71
114.8	46	8.37
116.6	47	8.05
118.4	48	7.75
120.2	49	7.46
122.0	50	7.18
123.8	51	6.91
125.6	52	6.65
127.4	53	6.41
129.2	54	6.18
131.0	55	5.95
132.8	56	5.74
134.6	57	5.54
136.4	58	5.34
138.2	59	5.14
140.0	60	4.96

T°F	T°C	kΩ
140.0	60	4.96
141.8	61	4.79
143.6	62	4.62
145.4	63	4.46
147.2	64	4.30
149.0	65	4.16
150.8	66	4.01
152.6	67	3.88
154.4	68	3.75
156.2	69	3.62
158.0	70	3.50
159.8	71	3.38
161.6	72	3.27
163.4	73	3.16
165.2	74	3.06
167.0	75	2.96
168.8	76	2.86
170.6	77	2.77
172.4	78	2.68
174.2	79	2.60
176.0	80	2.51

For discharge

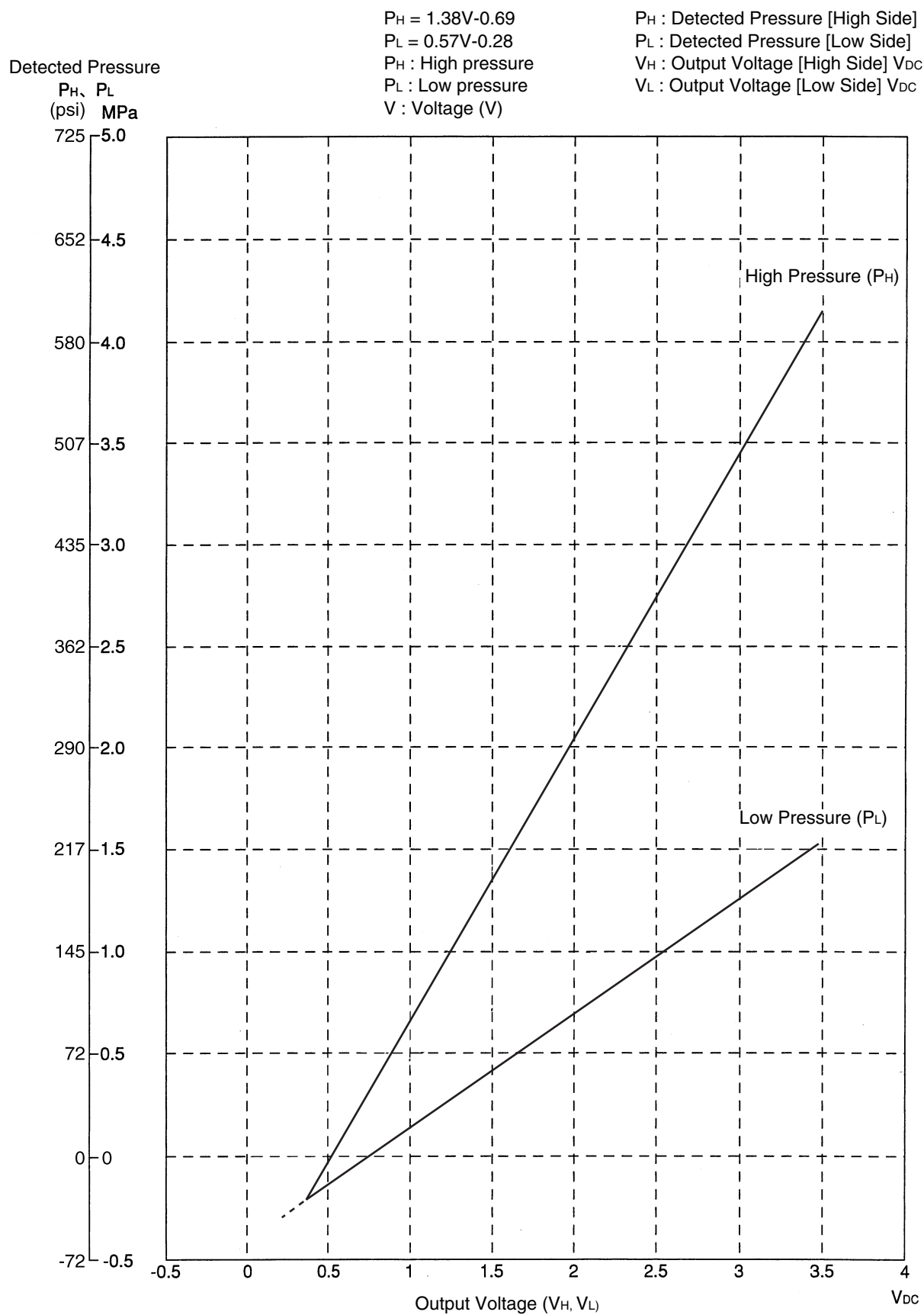
R2T

T°F	T°C	kΩ
—	—	—
—	—	—
21	-6.0	1120.0
25	-4.0	1002.5
28	-2.0	898.6
32	0.0	806.5
35.6	2.0	724.8
39.2	4.0	652.2
42.8	6.0	587.6
46.4	8.0	530.1
50.0	10.0	478.8
53.6	12.0	432.9
57.2	14.0	392.0
60.8	16.0	355.3
64.4	18.0	322.4
68.0	20.0	292.9
71.6	22.0	266.3
75.2	24.0	242.5
78.8	26.0	221.0
82.4	28.0	201.6
86.0	30.0	184.1
87.8	32.0	168.3
91.4	34.0	154.0
95.0	36.0	141.0
98.6	38.0	129.3
102.2	40.0	118.7
105.8	42.0	109.0
109.4	44.0	100.2
113.0	46.0	92.2
116.6	48.0	84.9
120.2	50.0	78.3
125.6	52.0	72.2
129.2	54.0	66.7
132.8	56.0	61.6
136.4	58.0	57.0
140.0	60.0	52.8

T°F	T°C	kΩ
140.0	60.0	52.8
143.6	62.0	48.9
147.2	64.0	45.3
150.8	66.0	42.0
154.4	68.0	39.0
158.0	70.0	36.3
161.6	72.0	33.7
165.2	74.0	31.4
168.8	76.0	29.2
172.4	78.0	27.2
176.0	80.0	25.4
179.6	82.0	23.7
183.2	84.0	22.1
186.8	86.0	20.7
190.4	88.0	19.3
194.0	90.0	18.1
197.6	92.0	16.9
201.2	94.0	15.8
204.8	96.0	14.8
208.4	98.0	13.9
212.0	100.0	13.1
215.6	102.0	12.3
219.2	104.0	11.5
222.8	106.0	10.8
226.4	108.0	10.2
230.0	110.0	9.6
233.6	112.0	9.0
237.3	114.0	8.5
240.8	116.0	8.0
244.4	118.0	7.6
248.0	120.0	7.1
251.6	122.0	6.7
255.2	124.0	6.4
258.8	126.0	6.0
262.4	128.0	5.7
266.0	130.0	5.4

T°F	T°C	kΩ
266.0	130.0	5.4
269.6	132.0	5.4
273.2	134.0	4.8
276.8	136.0	4.6
280.4	138.0	4.3
284.0	140.0	4.1
287.6	142.0	3.9
291.2	144.0	3.7
294.8	146.0	3.5
298.4	148.0	3.3
302.0	150.0	3.2
305.6	152.0	3.0
309.2	154.0	2.9
312.8	156.0	2.7
316.4	158.0	2.6
320.0	160.0	2.5
323.6	162.0	2.3
327.2	164.0	2.5
330.8	166.0	2.1
334.4	168.0	2.0
338.0	170.0	1.9
341.6	172.0	1.9
345.2	174.0	1.8
348.8	176.0	1.7
352.4	178.0	1.6
356.0	180.0	1.5
—	—	—

4. Pressure Sensor



Part 9

Precautions for New Refrigerant (R-410A)

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1. Precautions for New Refrigerant (R-410A)

1.1 Outline

1.1.1 About Refrigerant R-410A

■ Characteristics of new refrigerant, R-410A

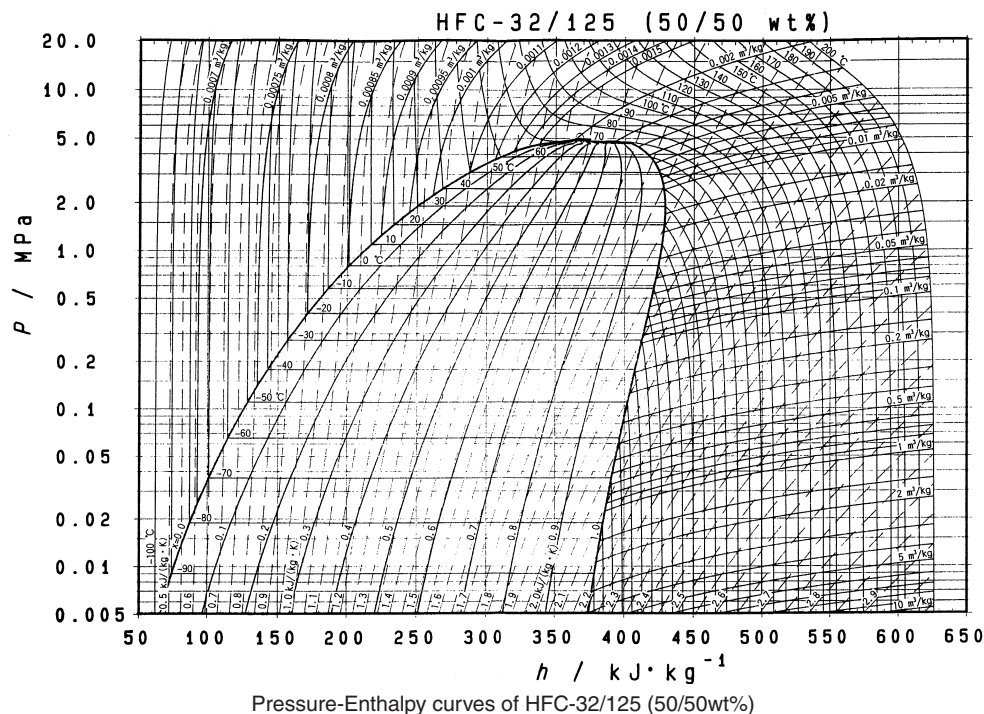
1. Performance
Almost the same performance as R-22 and R-407C
2. Pressure
Working pressure is approximately 1.4 times more than R-22 and R-407C.
3. Refrigerant composition
Few problems in composition control, since it is a Quasi-azeotropic mixture refrigerant.

	HFC units (Units using new refrigerants)		HCFC units
Refrigerant name	R-407C	R-410A	R-22
Composing substances	Non-azeotropic mixture of HFC32, HFC125 and HFC134a (*1)	Quasi-azeotropic mixture of HFC32 and JFC125 (*1)	Single-component refrigerant
Design pressure	3.2 MPa (gauge pressure) = 32.6 kgf/cm ² = 464 psi	4.0 MPa (gauge pressure) = 40.8 kgf/cm ² = 580 psi	2.75MPa (gauge pressure) = 28.0 kgf/cm ² = 399 psi
Refrigerant oil	Synthetic oil (Ether)		Mineral oil (Suniso)
Ozone destruction factor (ODP)	0	0	0.05
Combustibility	None	None	None
Toxicity	None	None	None

- ★1. Non-azeotropic mixture refrigerant: mixture of two or more refrigerants having different boiling points.
- ★2. Quasi-azeotropic mixture refrigerant: mixture of two or more refrigerants having similar boiling points.
- ★3. The design pressure is different at each product. Please refer to the installation manual for each product.

(Reference) 1 MPa ≒ 10.19716 kgf / cm²

1 MPa ≒ 145 psi



■ Thermodynamic characteristic of R-410A

DAIREP ver2.0

Temperature (°C)	Steam pressure (kPa)		Density (kg/m ³)		Specific heat at constant pressure (kJ/kgK)		Specific enthalpy (kJ/kg)		Specific entropy (kJ/KgK)	
	Liquid	Vapor	Liquid	Vapor	Liquid	Vapor	Liquid	Vapor	Liquid	Vapor
-70	36.13	36.11	1410.7	1.582	1.372	0.695	100.8	390.6	0.649	2.074
-68	40.83	40.80	1404.7	1.774	1.374	0.700	103.6	391.8	0.663	2.066
-66	46.02	45.98	1398.6	1.984	1.375	0.705	106.3	393.0	0.676	2.058
-64	51.73	51.68	1392.5	2.213	1.377	0.710	109.1	394.1	0.689	2.051
-62	58.00	57.94	1386.4	2.463	1.378	0.715	111.9	395.3	0.702	2.044
-60	64.87	64.80	1380.2	2.734	1.379	0.720	114.6	396.4	0.715	2.037
-58	72.38	72.29	1374.0	3.030	1.380	0.726	117.4	397.6	0.728	2.030
-56	80.57	80.46	1367.8	3.350	1.382	0.732	120.1	398.7	0.741	2.023
-54	89.49	89.36	1361.6	3.696	1.384	0.737	122.9	399.8	0.754	2.017
-52	99.18	99.03	1355.3	4.071	1.386	0.744	125.7	400.9	0.766	2.010
-51.58	101.32	101.17	1354.0	4.153	1.386	0.745	126.3	401.1	0.769	2.009
-50	109.69	109.51	1349.0	4.474	1.388	0.750	128.5	402.0	0.779	2.004
-48	121.07	120.85	1342.7	4.909	1.391	0.756	131.2	403.1	0.791	1.998
-46	133.36	133.11	1336.3	5.377	1.394	0.763	134.0	404.1	0.803	1.992
-44	146.61	146.32	1330.0	5.880	1.397	0.770	136.8	405.2	0.816	1.987
-42	160.89	160.55	1323.5	6.419	1.401	0.777	139.6	406.2	0.828	1.981
-40	176.24	175.85	1317.0	6.996	1.405	0.785	142.4	407.3	0.840	1.976
-38	192.71	192.27	1310.5	7.614	1.409	0.792	145.3	408.3	0.852	1.970
-36	210.37	209.86	1304.0	8.275	1.414	0.800	148.1	409.3	0.864	1.965
-34	229.26	228.69	1297.3	8.980	1.419	0.809	150.9	410.2	0.875	1.960
-32	249.46	248.81	1290.6	9.732	1.424	0.817	153.8	411.2	0.887	1.955
-30	271.01	270.28	1283.9	10.53	1.430	0.826	156.6	412.1	0.899	1.950
-28	293.99	293.16	1277.1	11.39	1.436	0.835	159.5	413.1	0.911	1.946
-26	318.44	317.52	1270.2	12.29	1.442	0.844	162.4	414.0	0.922	1.941
-24	344.44	343.41	1263.3	13.26	1.448	0.854	165.3	414.9	0.934	1.936
-22	372.05	370.90	1256.3	14.28	1.455	0.864	168.2	415.7	0.945	1.932
-20	401.34	400.06	1249.2	15.37	1.461	0.875	171.1	416.6	0.957	1.927
-18	432.36	430.95	1242.0	16.52	1.468	0.886	174.1	417.4	0.968	1.923
-16	465.20	463.64	1234.8	17.74	1.476	0.897	177.0	418.2	0.980	1.919
-14	499.91	498.20	1227.5	19.04	1.483	0.909	180.0	419.0	0.991	1.914
-12	536.58	534.69	1220.0	20.41	1.491	0.921	182.9	419.8	1.003	1.910
-10	575.26	573.20	1212.5	21.86	1.499	0.933	185.9	420.5	1.014	1.906
-8	616.03	613.78	1204.9	23.39	1.507	0.947	189.0	421.2	1.025	1.902
-6	658.97	656.52	1197.2	25.01	1.516	0.960	192.0	421.9	1.036	1.898
-4	704.15	701.49	1189.4	26.72	1.524	0.975	195.0	422.6	1.048	1.894
-2	751.64	748.76	1181.4	28.53	1.533	0.990	198.1	423.2	1.059	1.890
0	801.52	798.41	1173.4	30.44	1.543	1.005	201.2	423.8	1.070	1.886
2	853.87	850.52	1165.3	32.46	1.552	1.022	204.3	424.4	1.081	1.882
4	908.77	905.16	1157.0	34.59	1.563	1.039	207.4	424.9	1.092	1.878
6	966.29	962.42	1148.6	36.83	1.573	1.057	210.5	425.5	1.103	1.874
8	1026.5	1022.4	1140.0	39.21	1.584	1.076	213.7	425.9	1.114	1.870
10	1089.5	1085.1	1131.3	41.71	1.596	1.096	216.8	426.4	1.125	1.866
12	1155.4	1150.7	1122.5	44.35	1.608	1.117	220.0	426.8	1.136	1.862
14	1224.3	1219.2	1113.5	47.14	1.621	1.139	223.2	427.2	1.147	1.859
16	1296.2	1290.8	1104.4	50.09	1.635	1.163	226.5	427.5	1.158	1.855
18	1371.2	1365.5	1095.1	53.20	1.650	1.188	229.7	427.8	1.169	1.851
20	1449.4	1443.4	1085.6	56.48	1.666	1.215	233.0	428.1	1.180	1.847
22	1530.9	1524.6	1075.9	59.96	1.683	1.243	236.4	428.3	1.191	1.843
24	1615.8	1609.2	1066.0	63.63	1.701	1.273	239.7	428.4	1.202	1.839
26	1704.2	1697.2	1055.9	67.51	1.721	1.306	243.1	428.6	1.214	1.834
28	1796.2	1788.9	1045.5	71.62	1.743	1.341	246.5	428.6	1.225	1.830
30	1891.9	1884.2	1034.9	75.97	1.767	1.379	249.9	428.6	1.236	1.826
32	1991.3	1983.2	1024.1	80.58	1.793	1.420	253.4	428.6	1.247	1.822
34	2094.5	2086.2	1012.9	85.48	1.822	1.465	256.9	428.4	1.258	1.817
36	2201.7	2193.1	1001.4	90.68	1.855	1.514	260.5	428.3	1.269	1.813
38	2313.0	2304.0	989.5	96.22	1.891	1.569	264.1	428.0	1.281	1.808
40	2428.4	2419.2	977.3	102.1	1.932	1.629	267.8	427.7	1.292	1.803
42	2548.1	2538.6	964.6	108.4	1.979	1.696	271.5	427.2	1.303	1.798
44	2672.2	2662.4	951.4	115.2	2.033	1.771	275.3	426.7	1.315	1.793
46	2800.7	2790.7	937.7	122.4	2.095	1.857	279.2	426.1	1.327	1.788
48	2933.7	2923.6	923.3	130.2	2.168	1.955	283.2	425.4	1.339	1.782
50	3071.5	3061.2	908.2	138.6	2.256	2.069	287.3	424.5	1.351	1.776
52	3214.0	3203.6	892.2	147.7	2.362	2.203	291.5	423.5	1.363	1.770
54	3361.4	3351.0	875.1	157.6	2.493	2.363	295.8	422.4	1.376	1.764
56	3513.8	3503.5	856.8	168.4	2.661	2.557	300.3	421.0	1.389	1.757
58	3671.3	3661.2	836.9	180.4	2.883	2.799	305.0	419.4	1.403	1.749
60	3834.1	3824.2	814.9	193.7	3.191	3.106	310.0	417.6	1.417	1.741
62	4002.1	3992.7	790.1	208.6	3.650	3.511	315.3	415.5	1.433	1.732
64	4175.7	4166.8	761.0	225.6	4.415	4.064	321.2	413.0	1.450	1.722

1.2 Service Tools

R-410A is used under higher working pressure, compared to previous refrigerants (R-22, R-407C). Furthermore, the refrigerating machine oil has been changed from Suniso oil to Ether oil, and if oil mixing is occurred, sludge results in the refrigerants and causes other problems. Therefore, gauge manifolds and charge hoses that are used with a previous refrigerant (R-22, R-407C) can not be used for products that use new refrigerants.

Be sure to use dedicated tools and devices.

■ Tool compatibility

Tool	Compatibility			Reasons for change
	HFC		HCFC	
	R-410A	R-407C	R-22	
Gauge manifold Charge hose	×			- Do not use the same tools for R-22 and R-410A. - Thread specification differs for R-410A and R-407C.
Gas detector	○		×	The same tool can be used for HFCs.
Vacuum pump (pump with reverse flow preventive function)	○			To use existing pump for HFCs, vacuum pump adapter must be installed.
Weighting instrument	○			
Flaring tool (Clutch type)	○			For R-410A, flare gauge is necessary.
Torque wrench	○			Torque-up for 1/2 and 5/8
Pipe cutter	○			
Pipe expander	○			
Pipe bender	○			
Pipe assembling oil	×			Due to refrigerating machine oil change. (No Suniso oil can be used.)
Refrigerant recovery device	Check your recovery device.			
Refrigerant piping	See the chart below.			Only $\phi 19.1$ is changed to 1/2H material while the previous material is "O".

As for the charge mouthpiece and packing, 1/2UNF20 is necessary for mouthpiece size of charge hose.

■ Copper tube material and thickness

Pipe size [mm]	R-407C		R-410A	
	Material	Thickness [mm]	Material	Thickness [mm]
$\phi 6.4$	O	0.8	O	0.8
$\phi 9.5$	O	0.8	O	0.8
$\phi 12.7$	O	0.8	O	0.8
$\phi 15.9$	O	1.0	O	1.0
$\phi 19.1$	O	1.0	1/2H	1.0
$\phi 22.2$	1/2H	1.0	1/2H	1.0
$\phi 25.4$	1/2H	1.0	1/2H	1.0
$\phi 28.6$	1/2H	1.0	1/2H	1.0
$\phi 31.8$	1/2H	1.2	1/2H	1.1
$\phi 38.1$	1/2H	1.4	1/2H	1.4
$\phi 44.5$	1/2H	1.6	1/2H	1.6

* O: Soft (Annealed)
H: Hard (Drawn)

1. Flaring tool



■ Specifications

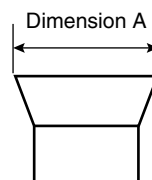
- Dimension A

Unit:mm

Nominal size	Tube O.D. Do	A ^{+0 -0.4}	
		Class-2 (R-410A)	Class-1 (Conventional)
1/4	6.35	9.1	9.0
3/8	9.52	13.2	13.0
1/2	12.70	16.6	16.2
5/8	15.88	19.7	19.4
3/4	19.05	24.0	23.3

■ Differences

- Change of dimension A



For class-1: R-407C
For class-2: R-410A

Conventional flaring tools can be used when the work process is changed.
(change of work process)

Previously, a pipe extension margin of 0 to 0.5mm was provided for flaring. For R-410A air conditioners, perform pipe flaring with a pipe extension margin of 1.0 to 1.5mm.
(For clutch type only)

Conventional tool with pipe extension margin adjustment can be used.

2. Torque wrench



■ Specifications

• Dimension B

Unit:mm

Nominal size	Class-1	Class-2	Previous
1/2	24	26	24
5/8	27	29	27

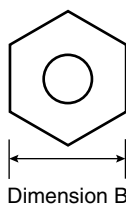
No change in tightening torque

No change in pipes of other sizes

■ Differences

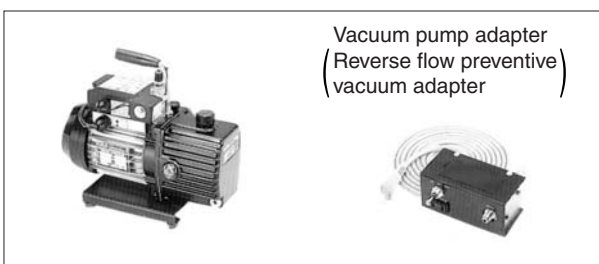
• Change of dimension B

Only 1/2", 5/8" are extended



For class-1: R-407C
For class-2: R-410A

3. Vacuum pump with check valve



Vacuum pump adapter
(Reverse flow preventive)
vacuum adapter

■ Specifications

• Discharge speed

50 l/min (50Hz)

60 l/min (60Hz)

• Suction port UNF7/16-20(1/4 Flare) UNF1/2-20(5/16 Flare) with adapter

● Maximum degree of vacuum

Select a vacuum pump which is able to keep
the vacuum degree of the system in excess of
–14.6 psi (5 torr or 5000 micron or – 755 mmHg).

■ Differences

- Equipped with function to prevent reverse oil flow
- Previous vacuum pump can be used by installing adapter.

4. Leak tester



■ Specifications

- Hydrogen detecting type, etc.
- Applicable refrigerants
R-410A, R-407C, R-404A, R-507A, R-134a, etc.

■ Differences

- Previous testers detected chlorine. Since HFCs do not contain chlorine, new tester detects hydrogen.

5. Refrigerant oil



■ Specifications

- Contains synthetic oil, therefore it can be used for piping work of every refrigerant cycle.
- Offers high rust resistance and stability over long period of time.

■ Differences

- Can be used for R-410A and R-22 units.

6. Gauge manifold for R-410A



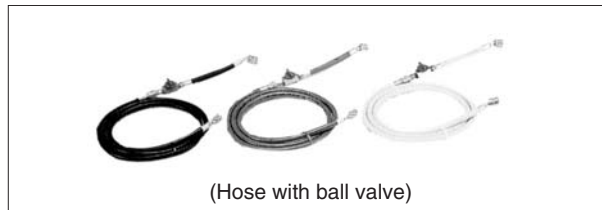
■ Specifications

- High pressure gauge
15 to 770 psi (-76 cmHg to 53 kg/cm²)
- Low pressure gauge
15 to 550 psi (-76 cmHg to 38 kg/cm²)
- 1/4" → 5/16" (2min → 2.5min)
- No oil is used in pressure test of gauges.
→ For prevention of contamination
- Temperature scale indicates the relationship between pressure and temperature in gas saturated state.

■ Differences

- Change in pressure
- Change in service port diameter

7. Charge hose for R-410A



■ Specifications

- Working pressure 737 psi (51.8 kg/cm²)
- Rupture pressure 3685 psi (259 kg/cm²)
- Available with and without hand-operated valve that prevents refrigerant from outflow.

■ Differences

- Pressure proof hose
- Change in service port diameter
- Use of nylon coated material for HFC resistance

8. Weigher for refrigerant charge



■ Specifications

- High accuracy
TA101A (for 10-kg cylinder) = $\pm 2\text{g}$
TA101B (for 20-kg cylinder) = $\pm 5\text{g}$
- Equipped with pressure-resistant sight glass to check liquid refrigerant charging.
- A manifold with separate ports for HFCs and previous refrigerants is equipped as a standard accessory.

■ Differences

- Measurement is based on weight to prevent change of mixing ratio during charging.

Regarding purchasing of service tools, please contact following address.

Daikin U.S. Corporation (Dallas Office)
1645 Wallace Dr, Ste 110 Carrollton, TX 75006
"Tel: 1-972-245-1510 FAX: 1-972-245-1038"

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Use only those parts and accessories supplied or specified by Daikin. Ask a qualified installer or contractor to install those parts and accessories. Use of unauthorized parts and accessories or improper installation of parts and accessories can result in water or refrigerant leakage, electrical shock, fire, or explosion.

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If you have any inquiries, please contact your local importer, distributor, or retailer.



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JMI-0107



JQA-1452

About ISO 9001

ISO 9001 is a plant certification system defined by the International Organization for Standardization (ISO) relating to quality assurance. ISO 9001 certification covers quality assurance aspects related to the "design, development, manufacture, installation, and supplementary service" of products manufactured at the plant.



EC99J2044

About ISO 14001

ISO 14001 is the standard defined by the International Organization for Standardization (ISO) relating to environmental management systems. Our group has been acknowledged by an internationally accredited program of environmental protection procedures and activities to meet the requirements of ISO 14001.

Dealer

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